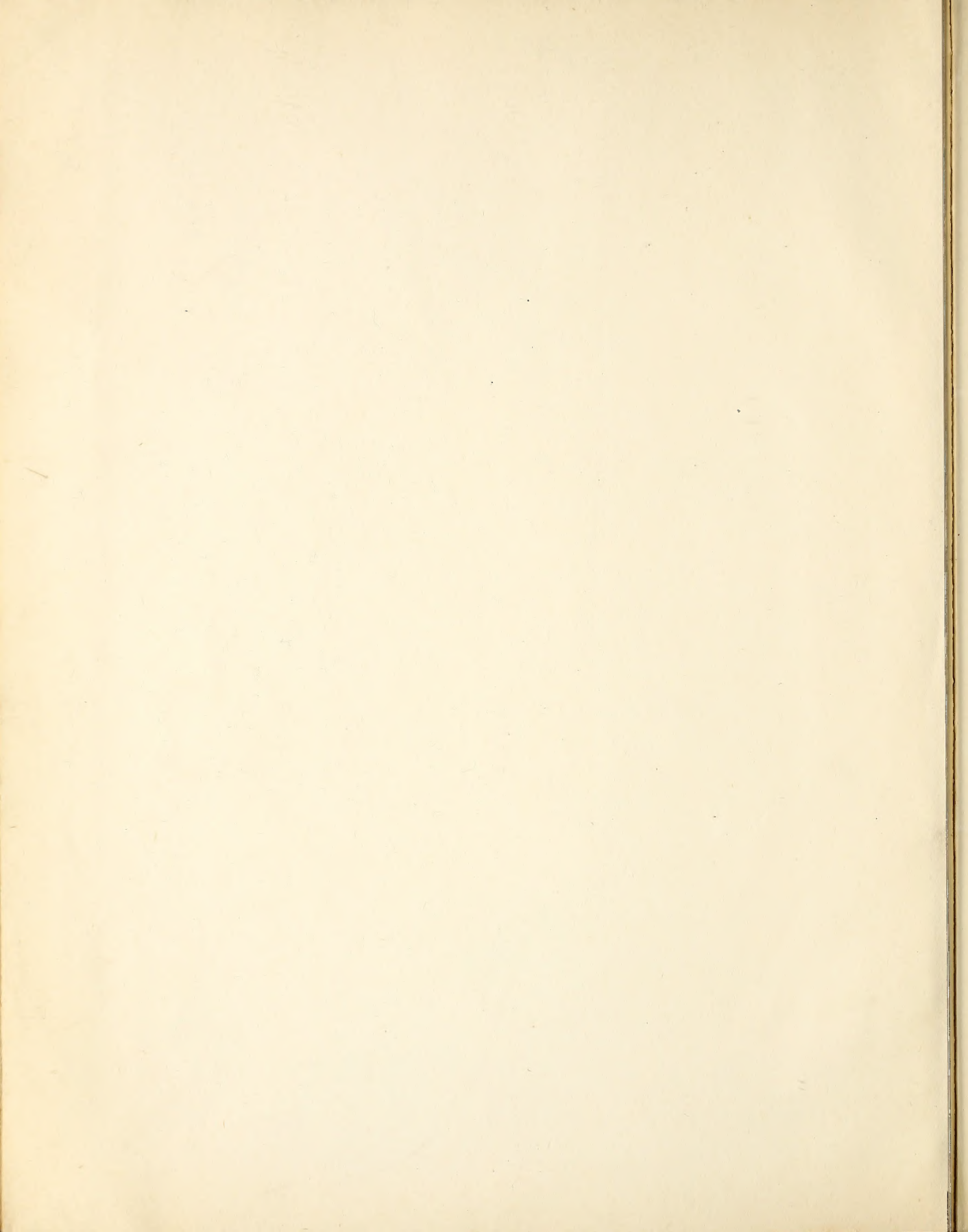


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North Carolina
Department of Conservation and Development

R. BRUCE ETHERIDGE, *Director*

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NORTH CAROLINA:
TODAY AND TOMORROW

•

Division of Commerce and Industry

PAUL KELLY, *Division Chief*

Compiled under the direction of
Theodore S. Johnson, *Chief Engineer*

RALEIGH, N. C.
1936

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PREFACE

This volume is the product of the joint effort of many persons on the staff of the Department of Conservation and Development, of the staff of the North Carolina State Planning Board, and many State officials. All have shown the utmost spirit of co-operation, devoting time and thought to the preparation of material contained herein.

Special acknowledgement is made to Robert N. Woodworth for the chapter on Population Studies; to W. Clyde Dunn for the studies in Governmental Service and Finance; to Miss Emily Vaughn for the review of Public Welfare Work; to W. H. Richardson, Frank Jeter, and Robert H. Ruffner for contributions to the chapter on Agricultural Resources. In the chapter on Industrial Development, much of the material there presented has been taken from the excellent records of the Department of Labor, which were made available through the courtesy of Mr. A. L. Fletcher, Commissioner.


Frequent use has been made of figures made available by the U. S. Census Bureau and the U. S. Department of Agriculture and the Bureau of Labor Statistics. The necessity for withholding figures where they would reveal the operations of individual companies serves occasionally to give an inadequate report of activities. In the tabulation of establishments, it has sometimes been impossible to obtain complete data on those of small capacity, but the totals shown will not vary greatly from the true amount.

The difficulty that has been encountered in securing factual material points very definitely to the necessity for the establishment and maintenance of agencies which will set up the means for securing regular and complete reports and making them available for public use.

It is proposed to prepare separate reports for each county in the State, giving more detailed information concerning the resources and development to be found therein, together with such additional data as may be found available. This work will proceed as rapidly as possible.

Mr. Paul Kelly, Assistant Director of the Department of Conservation and Development and Chief of the Division of Commerce and Industry, has actively collaborated in the preparation of this volume. His long experience in this field, his familiarity with the resources and industries of the State, has made his counsel and assistance most valuable.

It is proposed that this present volume will be the first of a continuing series, presenting at regular intervals a record of the progress and development of North Carolina. The Department of Conservation and Development will seek to keep the information up to date and constantly available to inquirers. The Division of Commerce and Industry, to which this special function is assigned, offers its services and interest to any interested parties.



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NORTH CAROLINA: TODAY AND TOMORROW

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FOREWORD

In announcing his candidacy for the governorship of North Carolina in 1932, Governor J. C. B. Ehringhaus made a statement of his program and of the policies which he would follow if elected.

In part these were as follows:

"We need to spend more of our time and energies in constructive thought and effort. We must build, not break, the commonwealth. We need a program of progress and of rehabilitation.

"There should be a continued insistence upon the enlargement of our live-at-home program; an added emphasis upon the profitable utilization of our waste areas in timber growing, game breeding, public hunting preserves and like usages; a definite movement towards discovering new uses and new markets for all our products, and meeting the challenge of our undeveloped resources.

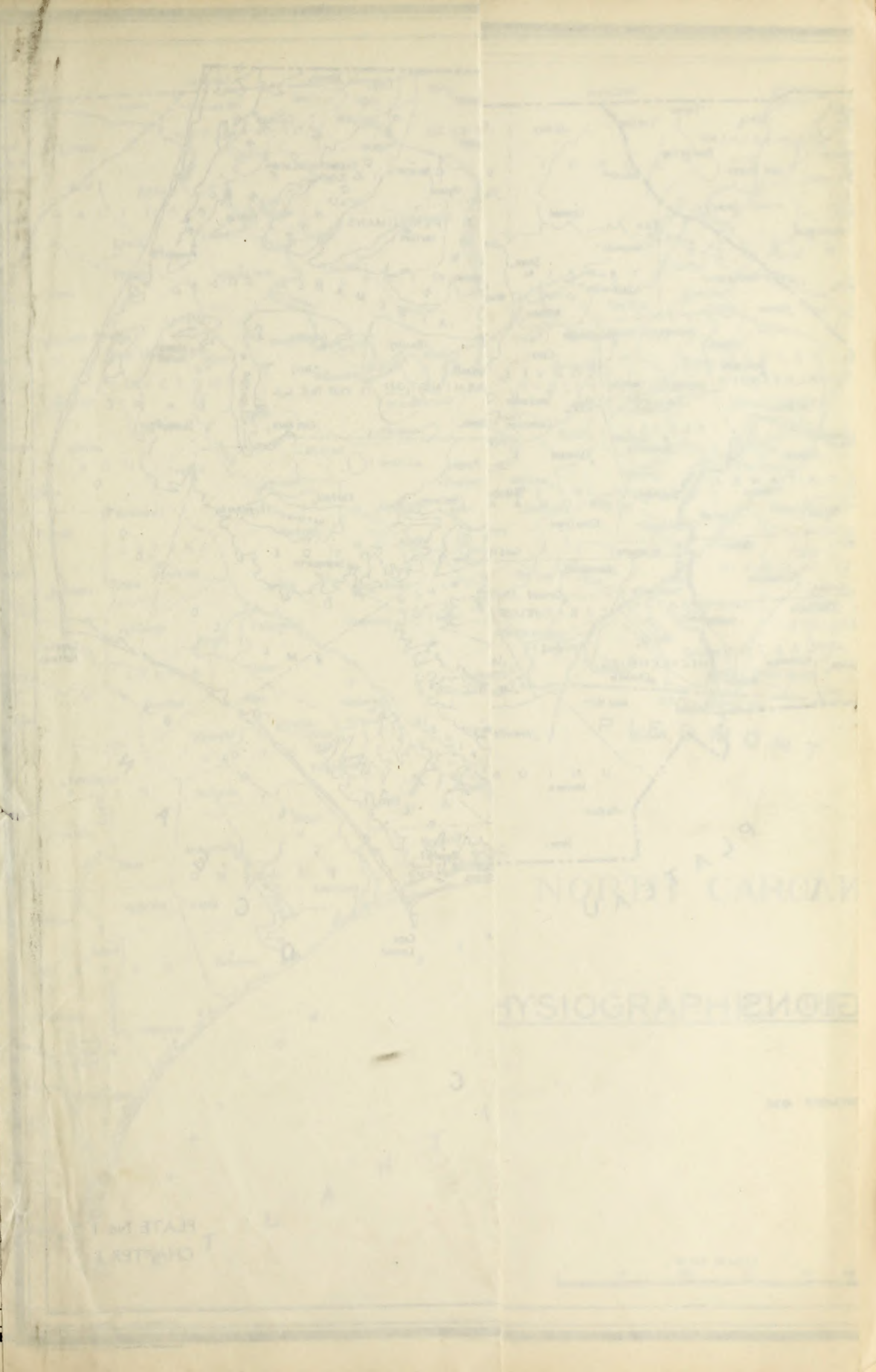
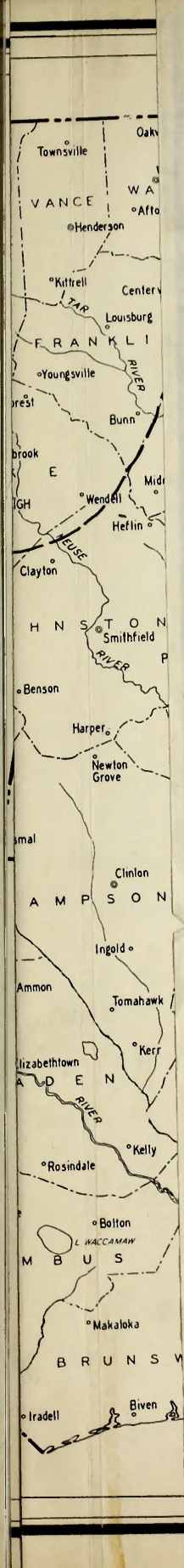
"I propose to mobilize, co-ordinate and make actively available all the energies and resources of the State in one real comprehensive and co-operative effort toward a realization upon these possibilities.

"To this end we shall seek and doubtless obtain the active interest of every organization, public and private, which looks toward civic growth and enterprise, every source of information, and every fount of learning, every citizen with dollars to invest and faith in the commonwealth.

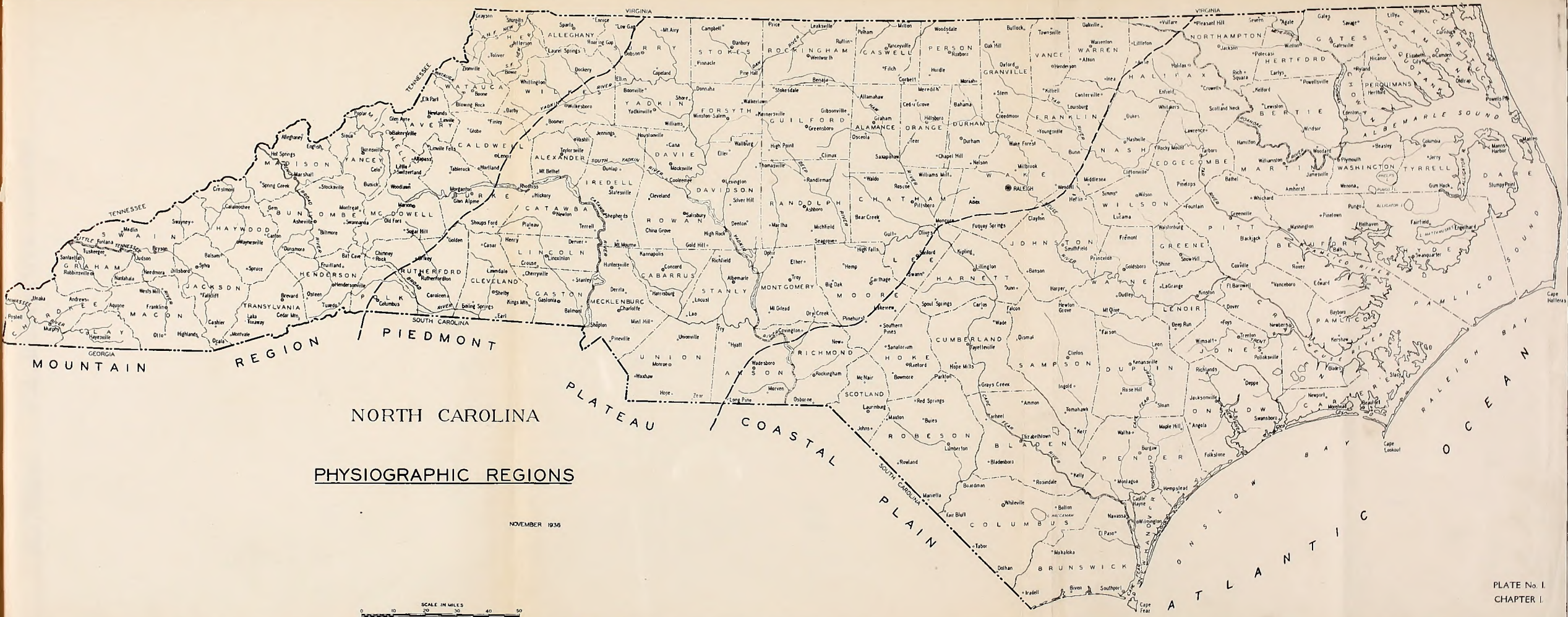
"We should have a comprehensive survey of every county in the State, with detailed information as to its possibilities immediately available to inquirers A bit of reasoned optimism, a fair share of confident courage and a lot of conscientious work, and we shall set the world an example in constructive conservation that will excite anew its admiration and see a new day dawning in the State which we love."

To the fulfillment of that promise, the present volume on "North Carolina: Today and Tomorrow," is dedicated.

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CHAPTER I

PHYSICAL CHARACTERISTICS OF THE STATE

PHYSIOGRAPHIC REGIONS

The State of North Carolina is situated on the eastern slope of the Appalachian Mountains, and is bounded on the north by Virginia, on the south by South Carolina, and on the east by the Atlantic Ocean. It lies between 34° and $36^{\circ} 30'$ north latitude. In its east to west direction, it extends from $75^{\circ} 30'$ west longitude to approximately $84^{\circ} 15'$ west longitude, the greater proportion of the State lying, however, between the 82° and 76° meridians. The extreme length of the State is over 500 miles, and its greatest width 188 miles. The total area of the State is 52,286 square miles, of which 48,666 square miles is in land.

The topography can perhaps best be described as one vast slope, extending from the mountains of the west, with altitudes of nearly 7,000 feet, to the level of the Atlantic Ocean. The State easily divides itself into three physiographic regions: in the west is the Mountain Region, composed of the broad Appalachian Plateau, bounded on the west by the Great Smoky Mountains and on the east by the Blue Ridge; the second, a submontane or Piedmont Plateau Region, extends from the foot of the mountains on the west to what is known as the "fall line," which runs in a northeast-southwest direction through the counties of Northampton, Halifax, Wake, Lee, Hoke, and Scotland; the third, or Coastal Plain, extends from the Piedmont section to the coast. A fourth area, sometimes designated as the Tidewater section, and comprising all that area of eastern Carolina within the barrier reefs, extends to the head of the sounds and rivers which form the determining physiographic features of this section.

From the Mountain section to the Piedmont the transition is very sharp, there being a drop of not less than 1,500 feet within a very few miles. The Piedmont, as well as the Coastal Plain, slopes gradually to the ocean, the average slope being approximately 1 foot to the mile.

THE MOUNTAIN REGION

This is so sharply and distinctly defined, and embraces so large a portion of the territory of North Carolina, as to merit a somewhat extended reference to its magnitude, its elevation and its characteristics. Broadly considered it may be treated as a high plateau, bounded on the east by the irregular chain known as the Blue Ridge, extending across the State in a general direction from northeast to southwest, until, reaching the southeastern border of Henderson County, it turns to the west and forms for a long distance part of the southern boundary of the State, passing at length by a southwest projection into the State of Georgia, and again reuniting with the chain of the Great Smoky Mountains, to which it had made near approach on its entry into North Carolina in the counties of Ashe and Watauga.

The average elevation of the Blue Ridge is nearly 4,000 feet, though on the southern and northern extremities it drops to 3,000 feet, its lower gaps being a little above 2,000 feet over the main level of the Piedmont country. Seen from the east, the chain presents the aspect of a steep and rugged escarpment springing suddenly from the Piedmont Plateau to an altitude of from 2,000 to 3,000 feet above it. From the west the appearance is that of a low and ill-defined ridge, in some places, as in parts of Henderson and Macon counties, presenting almost a smooth, unbroken horizontal line; again uplifting itself in bold prominence, attaining the height of nearly 6,000 feet, as in the Grandfather and the Pinnacle, the conspicuous summits so attractively visible near Round Knob, on the Western North Carolina Railroad.

The western boundary of this division is that long chain known under the various names of the Iron, the Smoky, and the Unaka Mountains, and forming the dividing line between North Carolina and Tennessee, and enclosing with marked definiteness the plateau of Western North Carolina. The area of this division approximates 6,000 square miles. The plateau is the culminating region of the Appalachian system, and contains not only its largest masses, but also its highest summits. It is divided by a number of cross ridges, and consequently into a number of smaller plateaus or basins, each bounded on all sides by high mountains and having its own independent system of rivers or drainage. It is this connection or interlacing of the outside bounding chains by the agency of the numerous cross chains that gives Western North Carolina its marked mountain character, its alternation of high mountain ranges with corresponding valleys and their attendant rivers, and the numerous lateral spurs, penetrated also by their valleys and their mountain torrents, and all arranged with an order and a symmetry as rare as it is beautiful.

The chief of these cross ranges in exceptional elevation is known as the Black Mountains, consisting of a single short ridge extending in a northerly direction from the point where it leaves the Blue Ridge. Its total length is only about fifteen miles, but within this short distance there are a dozen peaks that rise to an elevation of more than 6,000 feet above the sea, and one of these—Mitchell's Peak—the highest mountain on the eastern half of the continent, has an altitude of 6,684 feet. Between the French Broad and the Pigeon rivers stretches the long ridges of the Pisgah and the New Found Mountains, interrupted by the valley of Hominy Creek, the opening of which offers convenient passway to the next parallel ridge, the Balsam Mountains, which extends in unbroken continuity from the South Carolina line on the south to the Great Smoky Mountains on the Tennessee border on the north. This range has a mean elevation of about 5,500 feet, with fifteen summits exceeding 6,000 feet; and across the range are only two passways or gaps suitable to the passage of wheeled vehicles, one of which, traversed by the Western North Carolina division of the Southern Railway, is 3,357 feet above sea-level; the other, Soco Gap, being 4,341 feet high. Then comes the Cowee Mountains, extending nearly across the State, and separated from the Great Smokies by the narrow valley of the Tuckaseegee River. The mean height of this ridge is about 4,800 feet, the highest summit, at the southern end, being Yellow Mountain, 5,133 feet. Then succeeds the massive and very bold double chain of the Nantahala and Valley River Mountains, with a mean height of 5,000 feet, the two branches of which lie in close parallelism from the Georgia State line on the south as far as the Red

Marble Gap on the north, where they separate, one branch directed westward and known as the Long Ridge, and uniting itself with the Great Smoky Mountains in Cherokee County; the other extending to the northeast, under the name of the Cheoah Mountains, and ending without definite connection in undefinable ridges or isolated peaks.

On the east side of the Blue Ridge and extending into the Piedmont region are a series of short and irregular ridges or spurs. Among these are the Saluda, Green River, Tryon and Hungry Mountain masses, with all more or less separated from the Blue Ridge by the deep valleys or gorges carved by the river torrents which have cut through them and thus unite with the waters flowing toward the Atlantic; the waters on the west of the Blue Ridge, on the contrary, all directing their courses toward the Mississippi or its tributaries. Two other and more prominent ridges extend into this Piedmont Plateau for considerable distance. The South Mountains, commencing as foot hills of the Blue Ridge in western McDowell, extend in a general easterly direction, south of the Catawba River to western Catawba County, a distance of some fifty miles. They reach their maximum development near the junction of Burke, McDowell and Rutherford counties, where several knobs have an elevation of nearly 3,000 feet. The other of these two ridges, the Brushy Mountains, cut off from the Blue Ridge at the west by several tributaries of the Catawba, assumes definite proportions in eastern Caldwell County and extends northeast more or less parallel to the Yadkin Valley and Blue Ridge on the north, as far as the Sauratown Mountains in Stokes County, a distance of some eighty miles. In Yadkin and Surry counties these mountains nearly disappear, but they reappear in Pilot, Eaton and Moore's Knobs to the northeast.

The Linville Mountains, though a distinct spur from the Blue Ridge, are so coincident with it in perspective and in general characteristics as to need no mention as a distinct ridge.

The above embrace the whole mountain system of North Carolina, and in the western section unmistakably present the culmination of the great Appalachian system, as illustrated by the highest summits lifted up in all the territory of the United States east of the Rocky Mountains, and also as the source from which many large rivers radiate to flow toward the opposite directions of the Atlantic Ocean, the Gulf of Mexico, and the Mississippi River and its tributaries.

There are in this mountain area forty-three peaks which attain an elevation of over 6,000 feet, and eighty-two mountains which exceed 5,000 feet in elevation, most of which closely approximate 6,000 feet. Among these may be named the following: Clingman's Dome, 6,660; Mount Guyot, 6,636; Mount Buckley, 6,599; Mount Henry, 6,373; Mount Love, 6,443; Mount Alexander, 6,447. These are all located in the Great Smoky Mountains. In the Balsam Mountains, the most notable peaks are: Double Spring Mountain, 6,380; Richland Balsam, 6,370; and Chimney Peak, 6,234. In the Black Mountains will be found Black Dome, 6,502; Mount Gibbs, 6,591; and Hairy Bear, 6,681; while towering above these and other high peaks is Mount Mitchell, the highest elevation of eastern United States, with a height of 6,684 feet.

The contours of all the mountains are gentle, the summits usually presenting smooth, rounded outlines, and except on the southern border presenting but few precipitous slopes. With the notable exception of Caesar's Head and Whiteside Moun-

tain, where sheer perpendicular rock faces 1,800 feet in height are to be found, the mountains are usually covered with deep rich soil and clothed with massive forests to their tops. To this general condition there is one remarkable exception in those mountains locally called *balds*, which are marked with natural open meadows covered with rich herbage or grass.

In the Mountain Region will be found some of the most attractive contrasts between high wooded mountains and deep fertile valleys. Most important of these are the upper French Broad and Mills River valleys, the Swannanoa valley, in Buncombe County, the Pigeon River and those of the Valley River and Hiwassee in the extreme southwestern part of the State.

Rich in timber and mineral resources, finely adapted in its open spaces for grazing and for meadow cultivation, the mountain section has within the last few years rapidly developed. This development has taken place largely because of the penetration of the entire area with a network of paved roads, which have opened up to the outside world the marvelous resources and attractiveness of this region.

PIEDMONT REGION

This region is intermediate between the mountains and the Coastal Plain, and comprises nearly one-half of the territory of the State. Distinctive in topography, productivity, and industrial development, this region has developed into the most prosperous and densely populated section of the State. The bold outline of the mountains is transformed into a series of gentle hills and valleys, which presents a variety and charm of landscape, different on the one hand from the mountains to the west, and on the other from the even monotony of the plains or levels of the east. Through this Piedmont region run a great abundance of streams, whose headwaters lie in the mountain slopes and which run in a general southeast direction, gradually uniting into distinct river valleys, such as the Chowan, the Roanoke, the Neuse, the Cape Fear, the Yadkin, and the Catawba rivers. It is in this section of the State that most development has taken place. Scattered throughout this entire area are large numbers of thriving villages and towns, some of which have grown to truly metropolitan size. Here is presented a mingled development of industrial, agricultural and urban life. In this region have been developed the great water powers of the State, which have furnished an abundance of power for industrial development.

Elevations in the Piedmont Plateau vary from nearly 1,000 feet in the northwestern section, to approximately 300 feet in the Sandhills of the southern Piedmont.

COASTAL PLAIN REGION

East of the "fall line" lies the vast plain of the State, which averages some 150 miles in width and extends from the north to the southernmost part of the State. Vast areas of this Coastal Plain are found to be practically level, and in the lower reaches of the Plain adjacent to the sounds are to be found many low-lying areas filled with swamps and lakes. Over this entire section the primitive basal rocks are covered with deep strata

of sand, clay, and gravel, frequently mixed with a quantity of shells. The upland areas are for the most part sandy loam, easily worked and very productive in the crops there cultivated.

The streams which extend deeply into the Coastal Plain are navigable throughout much of their lower extent.

RIVERS AND SOUNDS

A distinctive feature of the physiography of North Carolina is the streams which traverse its entire area. The State naturally divides itself into the following river basins: the Chowan, Roanoke, Tar, Neuse, Cape Fear, Yadkin, Catawba, and Broad, all of which drain into the Atlantic Ocean; while the Hiwassee, the Little Tennessee, French Broad, and New River basins drain into the Tennessee and the Gulf of Mexico. On the eastern coast is a remarkable succession of sounds, lying behind the barrier reef, or outer banks which form such a distinctive boundary to the State on the east. Beginning at the Virginia line with the Currituck Sound, followed by the great reach of fresh water known as the Albemarle Sound, these two join through the channels of Roanoke and Croatan sounds to the vast area of salt water known as the Pamlico Sound. South of the Pamlico, and narrowing as the mainland approaches nearer to the main ocean barrier, are found Core and Bogue sounds, while south of these will be found an innumerable series of sounds, connected to the ocean through many inlets and providing a channel for the Intracoastal Waterway, which traverses the entire eastern boundary of the State.

These sounds furnish an immense area in which is to be found an abundance of shellfish and fin fish in wide variety.

Comprising as it does mountain, piedmont, and coastal lands, the State presents a wide diversity of natural resources, agricultural and industrial development, scenic and recreational opportunities, which make it almost unique.

CLIMATE

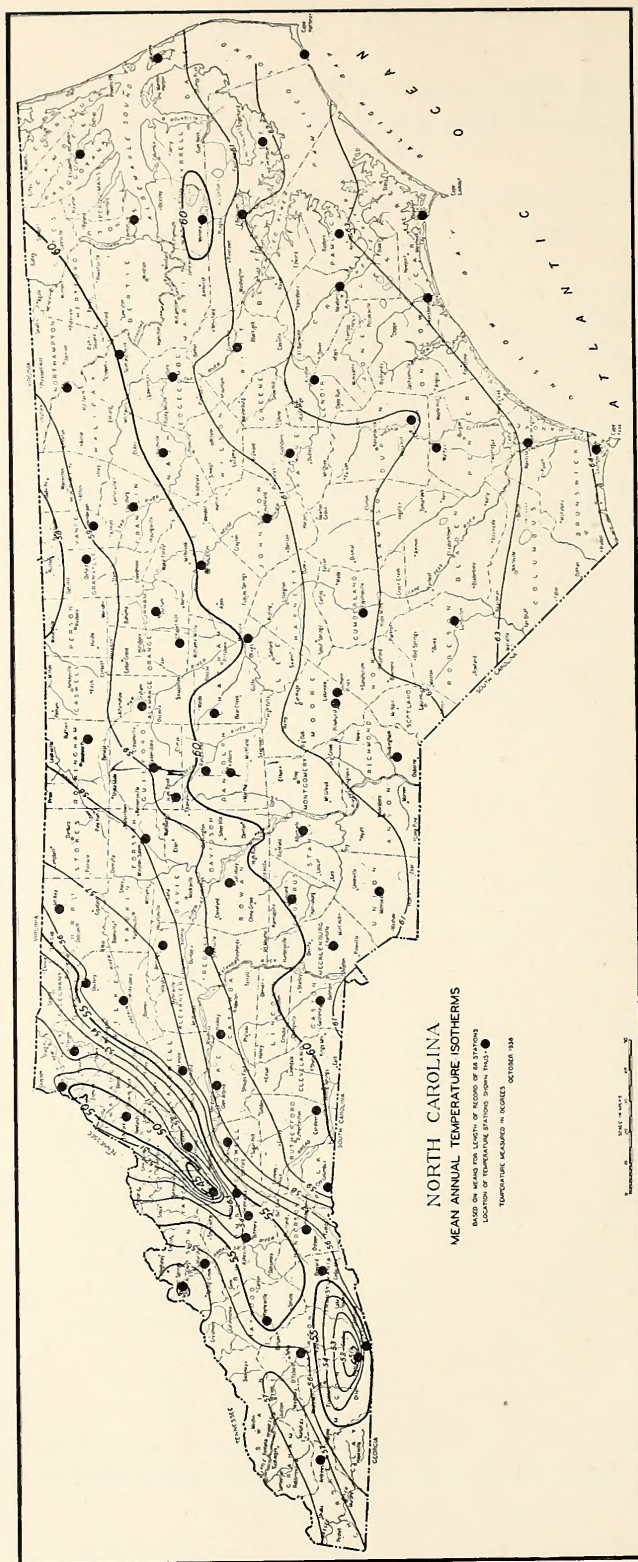
In general, the climate of North Carolina may be said to be typical of that usually found in the warm temperate zone. The State lies approximately at the same parallel of latitude as the Mediterranean basin, but is affected largely by its position with relation to the ocean on the east and the high mountain area on the west. In the east, the ocean acts to lessen the changes in temperature, both diurnal and seasonal, and at the same time tends to increase the amount of precipitation. Contrary to prevailing impression, the nearness of the Gulf stream, which lies some 50 to 70 miles off-shore from Cape Lookout and Cape Hatteras, has a minimum effect on the climate in the east, both because the prevailing winds throughout most of the year are either from the southwest or the northeast and because the Gulf stream is separated from the land by 50 miles of colder water.

TEMPERATURE

The mean temperature of the Mountain Region is approximately 56.5°, varying from 48.4° at Linville, to 61.4° at Rockingham. The variations in minimum temperature

NORTH CAROLINA
MEAN ANNUAL TEMPERATURE ISOTHERMS

MEAN ANNUAL TEMPERATURE ISOTHERMS
BASED ON MEANS FOR LENGTH OF RECORD OF 44 STATIONS
LOCATION OF TEMPERATURE STATIONS SHOWN PLUS • ●
TEMPERATURE MEASURED IN DEGREES
OCTOBER 1934



are greater than for maximum temperature, due partly to local topography as well as to striking differences in elevation. There is comparatively little severe cold weather until the middle of December over this area. January and February are usually the coldest months, while July is the warmest. The mountain ranges serve as partial barrier to cold waves, which therefore reach the Piedmont area in somewhat modified form. Practically all parts of the area have experienced temperatures slightly below zero, but severe cold weather seldom lasts more than three or four days. Nearly all the Piedmont stations have records of 100° in the months of June, July and August, but the number of days in which the temperature exceeds 95° is comparatively small. The crop growing season varies considerably throughout the western portion of the State. At Charlotte, for example, the average date of the last killing frost in the spring is March 25, and the first frost in autumn is November 5, a period of 225 days; while at Banners Elk the similar period is from May 11 to October 5, or 157 days. In the central and south-eastern portion of the State, the mean annual temperature varies somewhat uniformly from the northern to the southern boundary. The mean annual temperature for this area averages 60.6°, and ranges from 56.9° at Saxon to 64.1° at Southport.

January is the coldest month, the lowest average for twenty years or more being 37.4° at Saxon. The warmest month is July, and the highest July average is 80.4° at Southport. Zero temperatures are of rare occurrence, especially in the southern portion, and there is no record as low as zero in the coast counties or in the interior of the Coastal Plain as far south as Lumberton. Almost every station in the area has a maximum record of 100° or slightly above for the months of June to September. Cold periods are usually of short duration, and the ground is seldom frozen more than a few inches. Outdoor work is carried on practically throughout the year.

The average date of the first killing frost in autumn for a period of twenty years or more varies from October 17 in the north to November 16 in the south. The earliest killing frost in a few of the northern stations occurs as early as October 1. The average length of the growing season along the northern border of the cotton belt throughout portions of Durham, Chatham, and Randolph counties, is about 195 days; but the main cotton producing area within the central section of the State has a growing season of from 205 to 220 days. In the northeastern section of the State the average annual temperature varies but little from that of the central, the figure being 60.4° for the period from the establishment of stations to 1930. The lowest annual temperature in the northwest portion is 58°, while that on the southern coast near Beaufort is 64°.

Comparatively little cold weather prevails over this area until the latter part of December. Zero weather has been recorded occasionally in the northwestern portion of this area, but there is no record of zero weather within twenty or thirty miles of the coast, and some winters pass without temperatures much below the freezing point along the southern seaboard.

The average length of the growing season for the section as a whole is 216 days, varying from 197 at Weldon to 270 at Beaufort. It is to be noted, however, that there are limited areas in the lower Coastal Plain, such as the N. C. State Experiment Farm at Wenona, where the average growing season is perhaps two weeks shorter than at any other station.

The following table gives the data for selected stations throughout the State.

Station	Average Temperature	Highest Temp.	Lowest Temp.	Length Growing Season Days	Length Record Years
Beaufort	71.1	97	4	269	35
Elizabeth City	72.5	104	—2	208	24
Hatteras	67.7	93	0	295	62
Henderson	69.0	106	8	208	43
Littleton	68.8	104	—4	202	..
Tarboro	73.1	106	—2	203	51
Greenville	72.9	103	0	207	31
Washington	73.7	105	3	210	..
Southport	64.1	103	1	242	81
Chadbourn	63.2	104	10	213	..
Southern Pines	61.7	107	—4	210	41
Raleigh	60.0	103	—2	223	65
Greensboro	59.0	104	—3	205	55
Reidsville	57.6	105	—2	199	37
Roxboro	58.1	102	—7	200	..
Charlotte	60.3	103	—5	225	60
Statesville	58.8	103	—3	196	34
Mt. Airy	56.2	104	—15	174	47
Jefferson	52.2	97	—20	162	28
Asheville	55.1	96	—6	193	57
Andrews	57.1	99	—6	174	..
Hendersonville	55.6	99	—9	177	39

Temperature observation stations are now maintained in eighty-seven places in North Carolina.

PRECIPITATION

Records of precipitation in North Carolina have been kept at ninety-three stations, thirty-five of which are in the western part, twenty-two in the eastern, and thirty-six in the central and southeastern portions of the State. Eight of these stations have records covering more than forty years, thirty-one have records of thirty years or more, and fifty-eight stations have continuous records of twenty years or more.

The isohyetal lines for the State have been determined on the basis of these records, and those of nearby stations in neighboring states. While the pattern of distribution is somewhat irregular, certain interesting facts stand out.

The highest rainfall in the State is found in Macon County near Highlands and Rock House, where a forty-year record indicates an average annual rainfall of 81.72 and 82.41 inches, respectively. At Highlands the annual rainfall has varied from a maximum of 111.20 inches in 1915, to a minimum of 53.44 inches in 1925, while the rainfall has been in excess of 90 inches in nine years out of the total record period.

At Rock House station the all-time maximum annual rainfall is 113.85 inches in 1906, the minimum year being 1925, when the rainfall was only 50.69 inches.

Strangely enough, the lowest rainfall in the State is found within fifty miles of Highlands, near Asheville and Marshall. At the latter place, the average annual rainfall, the lowest found in the State, is 39.08 inches. 1925 was the minimum year at this station also, the precipitation being 25.71 inches for that year.

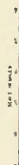
Another area of high annual rainfall is to be found in the vicinity of Linville, where the station average is 62.72 inches.

NORTH CAROLINA
MEAN ANNUAL RAINFALL ISOHYETS

BASED ON AN AVERAGE OF RECORDS OF 75 STATIONS
 PERIOD OF 1898 TO 1922
 LOCATION OF RAINFALL STATIONS SHOWN IN ●
 RAINFALL MEASURED IN INCHES
 OCTOBER 1948

NORTH CAROLINA
MEAN ANNUAL RAINFALL ISOHYETALS

BASED ON 34 YEAR MEANS OF RECORDS OF 77 STATIONS
PERIOD OF 1896 TO 1932
LOCATION OF RAINFALL STATIONS SHOWN IN INDICES
RAINFALL MEASURED IN INCHES
OCTOBER 1934



On the eastern coast near Wilmington is found a well defined area of lower rainfall, while New Bern is the approximate center of higher rainfall, the annual rainfall being 56.10 inches.

The characteristics of each of the three districts of the State as summarized by the U. S. Weather Bureau follow:

For the northeastern section of the State, the annual precipitation averages 48.47 inches, the largest average monthly amount being 6.1 inches in July, and the least, 2.56 inches in November. The rainfall increases from the northern border counties southward, being heaviest along and near Pamlico Sound. The average number of days with .01 or more inches of rainfall is 100. The average annual snowfall varies from 1 inch in the southeastern portion, to 13 inches in the northwestern part of this section. Some winters pass with little or no snow, and the heaviest amounts seldom remain on the ground more than a few days.

In the central and southeastern section, the annual precipitation is slightly lower than that in the east, being 47.26 inches. At New Bern, as noted above, the rainfall is approximately 56 inches, being the heaviest rainfall of any station east of the Blue Ridge. The distribution of rainfall is normally very good, and the lighter rainfall of autumn is favorable for harvesting crops, especially in picking cotton. In July and August, days in which precipitation takes place are greatest, and least in November. Snowfall ranges from less than 2 inches on the coast, to perhaps 11 or 12 inches in the extreme northern portion. Snow very rarely falls until after Christmas, especially in the southern portion. Sunshine over this section averages about 62% of the possible amount, the highest percentages being in May and October. Consideration of rainfall in the western portion of the State brings at once to the attention the sharp contrast between the localized high rainfall in certain sections of the mountains, and the markedly lower rainfall in the lower and southern Piedmont Region; while the average for the Piedmont and the Mountain Region is 58 inches, there are marked variations according to location with respect to the higher ranges and cross chains of mountains in relation to the normal currents of rain-bearing winds. All of the valleys or basins between the cross chains of mountains have less rainfall, as indicated in the French Broad valley, at Waynesville in the Pigeon River valley, and at Cullowhee, in the Tuckaseegee valley. On the mountain slopes and tops, the rainfall is much heavier, especially on the Blue Ridge and its eastern and southern slopes. Moisture-laden winds from the South Atlantic and Gulf Coast are cooled, and have their moisture condensed and largely exhausted in passing over the mountain heights. They then descend to less elevated or enclosed areas, such as the French Broad, with a greater capacity for moisture and in comparatively dry form. Attention has already been called to the area of high rainfall near Rock House and Highlands, and at the Linville region in the neighborhood of Linville and Blowing Rock. It should be noted that the Rock House and Highlands stations are on a rough abrupt southern slope, at an elevation of more than 3,000 feet, and overlooking a considerable portion of Georgia and South Carolina. Within a short distance of the Rock House station there is a nearly perpendicular drop of more than 600 feet. It is estimated that the annual precipitation along this portion of the Blue Ridge is 70 inches, or more, for a distance of about 25 miles. The heaviest rainfall of the year occurs in July and August, the rains being mostly local in character and frequently accompanied by thunder storms. But few tornadoes have

been recorded, and none with great damage or loss of life. Rainy days are slightly more frequent than in other sections of the State, the average for the year being 112 inches. As in other parts of the State, the largest number of rains occur in mid-summer, and the least in late autumn. The snowfall varies from 4 inches near Monroe, to a maximum of 47 inches in Ashe County, near the Tennessee line. Except in parts of the Mountain Region, it seldom remains on the ground more than three or four days, and it is comparatively unimportant in so far as floods are concerned.

Following is given a table for some of the stations in North Carolina.

TABLE II

35-YEAR RAINFALL NORMALS FOR NORTH CAROLINA FOR THE PERIOD 1898-1932

(Western)

Asheville	38.64	Linville Falls	59.70
Bryson City	54.81	Marshall	39.29
Cullowhee	44.30	Montreat	56.10
Hendersonville	59.42	Mount Holly	52.10
Hickory	49.90	Rock House No. 1	84.07
Highlands	84.90	Rockingham	47.43
Jefferson	49.00	Statesville	48.10
Lincolnton	48.10	Waynesville	46.33
Winston-Salem	44.88		

(Eastern)

Beaufort	51.60	Hatteras	47.17
Elizabeth City	48.10	Scotland Neck	44.40
Greenville	48.50	Tarboro	47.01
Wilmington	44.48		

(Piedmont)

Albemarle	48.10	New Bern	55.70
Chapel Hill	47.36	Pinehurst	46.40
Charlotte	44.19	Raleigh	45.47
Durham	42.20	Reidsville	43.60
Fayetteville	47.35	Roxboro	44.40
Goldsboro	48.74	Salisbury	48.59
Greensboro	47.05	Southern Pines	49.92
Lumberton	47.75	Southport	49.25

GEOLOGY

The State of North Carolina presents to the student of geology one of the most complex areas in the eastern United States. The wide variety of formations, the extremely irregular arrangement of strata, the large number of unconformities, all give mute but certain evidence that this area has been the scene of great and prolonged changes, wherein all the range of geologic forces and processes have had full sway.

The structure, texture, and position of the rocks tell to a great extent the conditions under which they were formed. Igneous rocks tell of volcanic activity, and, whether found in great masses or in smaller dikes and intrusions, show where great pressure drove the molten lava through the overlying strata. Metamorphic rocks tell of the intense heat and pressure exerted during the folding, gnarling and squeezing of former rocks. Sedimentary rocks also tell much of the conditions under which they were

formed, the fine-textured limestones and shales having been deposited in deep water, while the coarser sandstones and conglomerates were deposited in shallow waters near the shores of earlier seas.

Certain it is that the area within which North Carolina lies has been the arena within which great convulsive movements have taken place, raising great areas to heights far greater than any existing elevations, the attendant crumpling, folding, and breaking resulting in confusing rearrangements and irregularities. In this area, too, these forces were so great as to blot out much of the fossil evidence upon which geologists have learned to depend, in assigning geologic dates and classifying formations.

These great convulsive liftings of mountain masses were frequently interrupted with long periods of erosion, the sediments accumulating in ancient seas. Later these sedimentary areas would be lifted above the waters and in turn would be subject to long erosion superimposing great beds of sands, gravels and clays upon the older formations.

Therefore, the observer need not be surprised to find a wide variety of soils, rock outcrops, and irregular arrangements of mountains, plains, and valleys, as a result of these long and powerful geologic processes.

In Table III below is given a table of the geologic time divisions through which the earth surface has passed, and of formations to be found in North Carolina which are believed to be typical of these periods. The table is arranged with the earliest eras first, and the most recent periods last.

TABLE III
GEOLOGIC TIME DIVISIONS

Eras	Period (time term) or System (rock term)	Character of Rocks in North Carolina
Archeozoic "Oldest Life"	Great Granitoid Series	Granite gneisses
Proterozoic "Early Life"	Huronian	Igneous and sedimentary slates, lava flows and volcanic ash
Paleozoic "Ancient Life" Era of Invertebrate Animals and non- flowering plants	Cambrian Ordovician Silurian Devonian Mississippian Pennsylvanian Permian	Limestones, shales, sandstone and conglomerates Absent Absent Absent Absent Absent Absent
Mesozoic "Middle Life" (Age of Reptiles)	Triassic Jurassic Cretaceous	Conglomerates, sandstones, shales and coals Absent Loose sands, clays and marls
Cenozoic "Recent Life" (Age of Mammals)	Paleogene Neogene	Sands and gravels Sands, gravels and boulders, some- times marls and diatomaceous earth

As one travels from the extreme western limits of the State, eastward, one first encounters a large area in Cherokee, Graham, Swain, Haywood, and Madison counties where rocks and formations of the Cambrian period predominate.

Eastward of that area, covering most of the mountain section and extending well into the Piedmont, is an area, approximately one-fourth of the area of the State, where rocks of the Archeozoic Era predominate. Frequent occurrences are found throughout this area, of rocks of later periods, notably a narrow strip, extending entirely across the State, roughly parallel to the Blue Ridge, composed largely of metamorphic slates, schists, limestones, quartzites and conglomerates, all belonging to the Cambrian Age.

Continuing eastward, one encounters a broad belt, some fifty miles in width, in which rocks of the Proterozoic Era are to be found. This belt is bounded on the west by a line lying, roughly speaking, east of the cities of Shelby, Statesville, Winston-Salem, and Yanceyville, and extending eastward to an irregular line, passing through or near the eastern edge of Person, Orange, Chatham, Montgomery, and Union counties.

Another large area of these formations is found in Granville, Vance, Warren, Franklin, and Wake counties, marked on the east by the "fall line," or commonly accepted division between the Piedmont and the Coastal Plain regions.

Between the southern portion of this Proterozoic area and the Coastal Plain lies a narrow broken belt of sandstones and shales, cut by diabase dikes belonging to the Triassic period.

The entire Coastal Plain Region, except where modified by erosion in the stream valleys, is that belonging to the later Mesozoic Era, and more particularly to the Cretaceous period of that era. These are the loose sands, clays, and marls, so characteristic of the eastern portion of the State.

The eastern border of the State is no less interesting than the central and western, because here is the battleground between the land and the ocean. Lying but a few feet above mean tide level, marked by broad estuaries, swamp areas and great inland sounds, this region tells of periods of submergence and emergence of the shore line, and the effects of land and wave erosion.

The most notable feature of this coast line, making the Carolina coast unique above all other coastal states, is the long stretch of barrier reef or "banks," extending from the Virginia line southward to Cape Hatteras, and then in long south-westward arcs about Raleigh Bay to Cape Lookout and Onslow Bay to Cape Fear. Behind these barriers, cut only at intervals with the inlets, lie the sounds—Currituck, Albemarle, Roanoke, Pamlico, Core, and Bogue—teeming with fish and game, a region of great commercial and recreational importance.

It must be realized that this attempt to present the distinctive geological characteristics of the State is only approximate. Amid such complexity, with older and newer formations so frequently intermixed, the story is not complete.

Hereafter will follow a brief discussion of the formations in North Carolina representing the various eras and periods of geologic history.

The oldest rocks in North Carolina, those from the Archeozoic Era, are the granite gneisses which form most of the rocks of western North Carolina, with the exception of the area in the extreme western part in Cherokee, Clay, Graham, Swain, Haywood, and Madison counties. There are also scattered areas of younger rocks, beginning in Watauga County and extending in broken units to the South Carolina line. These gneisses are frequently cut by intrusions, which must have continued for very long periods. The periods of intrusion were probably interspersed with great movement causing many overlays and confusion of formations. Some of these contain large amounts of graphite, particularly in McDowell and Buncombe counties.

In these formations also are the many dikes in which are to be found the feldspar, kaolin, and mica deposits, found so extensively in Mitchell, Avery, Yancey, Jackson, and Macon counties. Closely associated with these minerals are the abrasive materials, corundum, spinel, and garnet and the magnetite ores, as at Cranberry Mines. Manganese, chromite, nickel and soapstone, are also found in these older formations.

The most important material taken from these old formations is the granite used so extensively for building, and structural stone, crushed stone, etc. The outstanding example of this stone are the granites mined at Mount Airy, N. C.

The Proterozoic Era is represented by an outcrop area perhaps twenty miles wide, in Person and Granville counties, extending in a belt of variable width across the State, covering parts of Anson, Union, and Mecklenburg counties.

These rocks also underlie a considerable portion of the Coastal Plain, as shown by exposures due to erosion. The igneous rocks in Granville, Warren, Franklin, Wake, and Orange counties, are represented by rhyolite, granite, andesite, diabase, and gabbro, these being the typical rocks. From this era also comes the deposits of volcanic ash, in Montgomery and Moore counties, and the volcanic tuff of Orange and Chatham counties.

Here, too, is the "slate belt," where occur some of the best gold mines of the State, such as the Portis and Arrington mines in Nash County, and the Iola and Montgomery mines in Union County.

Other than gold, minerals containing such metals as silver, copper, iron, and pyrophyllite have been mined from these slates.

Of the long era of the Paleozoic, only the Cambrian period is represented in North Carolina. The Cambrian rocks are those found in the extreme southwestern area above referred to, with scattered and narrow strips found eastward of the Blue Ridge. It is possible that the limestones found near Hot Springs, Madison County, belong to the Ordovician period, which occurred just after the Cambrian.

The Mesozoic Era is represented in North Carolina by several formations of the Triassic period, and very widely over the eastern portion of the State in the various subdivisions of the Cretaceous period.

The Triassic rocks are found in the Dan River and the Deep River areas.

No rocks of the Jurassic period are found in North Carolina.

More than half of the State is covered by deposits laid down during the various phases of the Cretaceous period. The Patuxent formation is the earliest, lying on the eroded edges of the basement rocks. This formation is essentially a mixture of sands and clays, light gray or greenish-gray in color, though locally stained by iron.

The Black Creek sands and clays and the Pee Dee sands are representative formations of the Upper or later Cretaceous period.

Deposits representing all epochs of the Cenozoic period occur widely throughout the Coastal Plain area. The Eocene period is represented by the Trent and Castle Hayne marls and shell rock; the Miocene by numerous formations of the lower plain, such as St. Mary's, Yorktown, Duplin and Waccamaw; the Pliocene by the Lafayette; the Pleistocene time by the Coharie, Sunderland, Wicomico, Chowan and Pamlico formations.

The full account of these various periods may be found in the publication of the Department of Conservation and Development, "The Story of the Geologic Making of North Carolina," by Herman J. Bryson, State Geologist, from which the above data was obtained.

NORTH CAROLINA LIBRARY COMMISSION

RALEIGH, N. C.

CHAPTER II

THE PEOPLE OF NORTH CAROLINA

No statement of the resources of a State would be complete that did not set forth the essential characteristics of its population, and the significant changes that have taken place in the past. The very remarkable growth of North Carolina within the last two decades is accompanied with significant changes in areal distribution, racial proportions, farm and urban residence, and age distribution.

This chapter presents the result of population studies, based upon the United States Census, the proper understanding and interpretation of which is basic to any correct estimate of the future development of North Carolina. For that reason, considerable space is given to the presentation of these facts.

INCREASE IN POPULATION 1890 TO 1930

The period 1890 to 1930 marked a very rapid growth of population in the State of North Carolina. Numbering only 1,617,949 in 1890, the population of the State grew to 3,170,276 by 1930. This represents an increase of 1,552,327 persons, or 95.9 per cent. Figure 1, which shows the increase of population by decennial periods from 1790 to 1930, together with the corresponding percentage increases, makes it evident that the largest part of population growth in the State occurred after 1870. From 1870 to 1880 the rate of growth was greatest,¹ while from 1920 to 1930 the growth in numbers was greatest. The rate of growth since 1890 was least rapid from 1910 to 1920.

To get a clearer concept of the growth of population in North Carolina, it is essential to make comparisons of the data presented above with those for the other states of the nation and those for the nation as a whole. Between 1890 and 1930, the population of continental United States (exclusive of Alaska) increased by 95.0 per cent. This rate, it is noticed, is slightly under that for North Carolina. On the other hand, 21 states and the District of Columbia grew more rapidly. But, it should be noted, of these 21 states, 14 were in the sparsely settled, most recently opened areas of the west and southwest—Arizona, California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. Six others were in the highly industrialized and urbanized northeast and middle states—Connecticut, Illinois, Michigan, New Jersey, New York, and Rhode Island. In the entire south, only Florida, a state highly specialized occupationally and noted as a resort region, increased more rapidly than North Carolina. Furthermore, while there were 15 states with larger populations than North Carolina in 1890, there were only 10 in 1930.

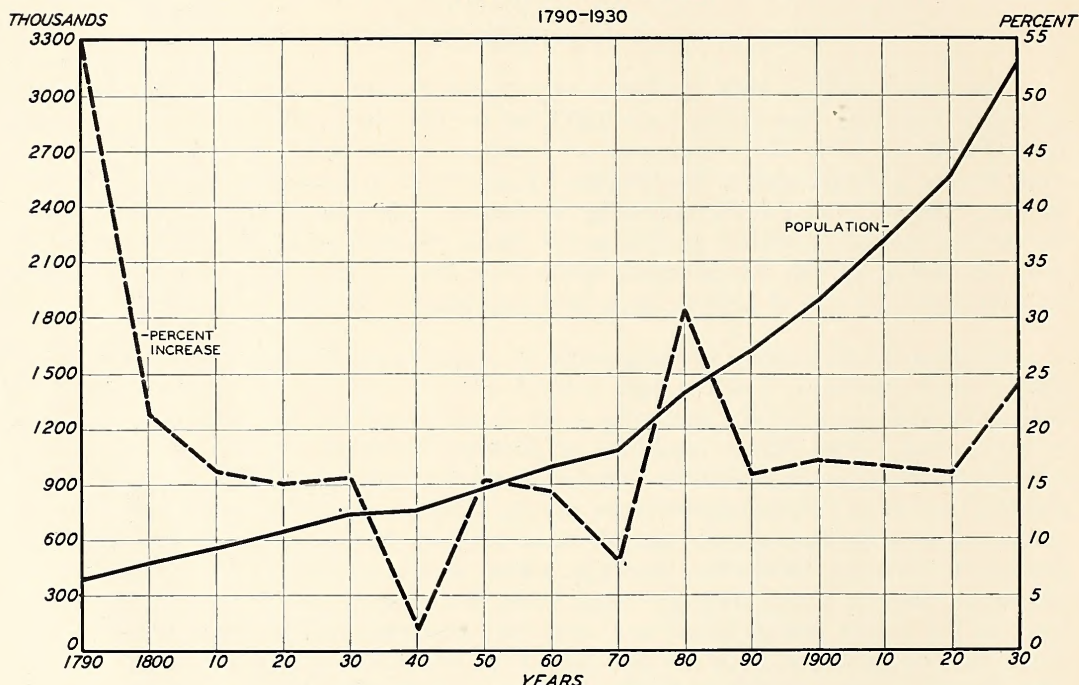
The data presented above shows that the population increase in North Carolina has been in tune with the very rapid rate of increase for the United States as a whole. But in order to grasp the full situation, two further points must be kept in mind. This increase of population in North Carolina has taken place in spite of the fact that the State has received the smallest part of the immigration to the United States from foreign countries, and has contributed more migrants to the other states of the nation than it has received from them.

¹This may not be valid, since the Census of 1880 has been generally discredited.

The relatively insignificant role in respect to population growth played by migration to the State from foreign countries is easily shown. In 1930, only 0.4 per cent of the population of North Carolina was foreign-born, including 8,788 persons classed as foreign-born white. This was the lowest ratio of foreign-born found for any state in the nation. In South Carolina, with the next lowest ratio, 0.6 per cent of the population was foreign-born. In Florida the ratio was 5.7 per cent; in California, 16.1; in New York, 26.3; and in continental United States, the ratio was 12.3 per cent foreign-born.

FIGURE 1

POPULATION GROWTH AND PERCENTAGE INCREASE
IN
NORTH CAROLINA
1790-1930



In 1930 there were 554,912 people born in North Carolina living in other states, while only 315,278 people born in other states were living in North Carolina. This indicates a net loss in population through interstate migration of 239,634. Of these, 110,799 were negroes. Expressed in another way, 16.3 per cent of the people born in North Carolina were living elsewhere in the United States, while only 10.0 per cent of the people living in North Carolina were born in other states.

GROWTH OF POPULATION BY AREAS

The growth of population has advanced at very different rates in various parts of the State. In two counties the population in 1930 was more than four times the population in 1890. In two more counties the population more than trebled; and in twenty-

PLATE IV

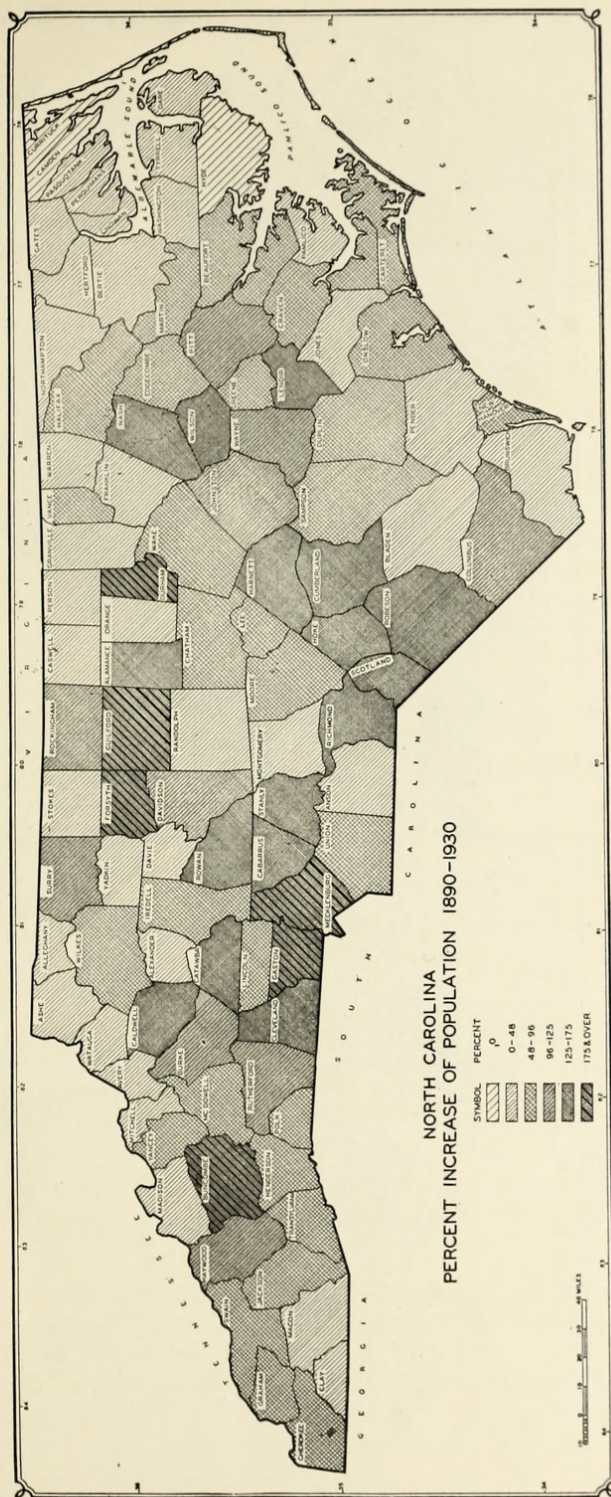
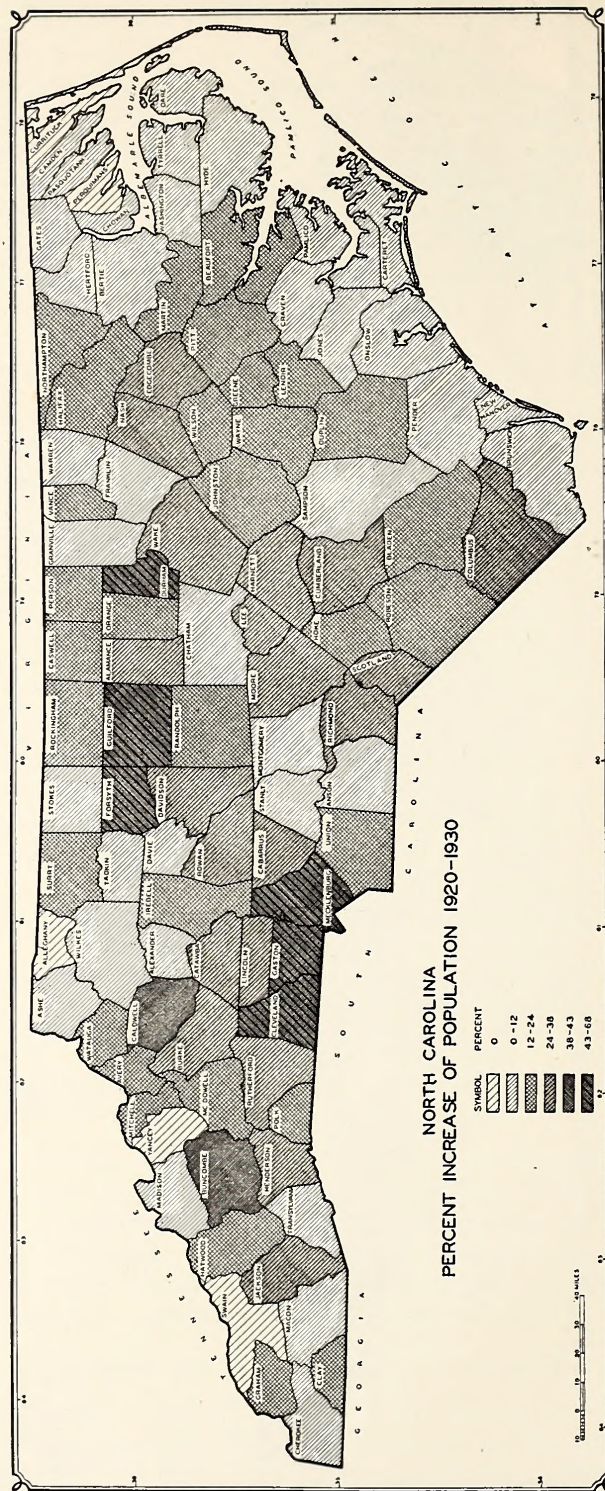


PLATE V



seven other counties the population more than doubled during this forty-year period. On the other hand, in three counties the population decreased, while in eleven others the increase was less than twenty-five per cent. In the four major regions of the State, as exhibited in Table IV, there are found different rates of increase. The Piedmont region², with the largest population in 1890, gained most rapidly, while the Tidewater region² had the slowest rate of growth. Data showing the changes in the population of each of these regions are given in the following table.

TABLE IV.

INCREASE OF POPULATION BY MAJOR REGIONS OF NORTH CAROLINA
1890-1930

Region	Population		Number Increase	Per Cent Increase
	1890	1930		
Highlands	250,376	457,455	207,079	82.7
Piedmont	723,384	1,560,741	837,357	115.7
Upper Coastal Plain	423,319	839,781	416,462	98.4
Tidewater	220,868	312,299	91,431	41.4

Plate IV depicts graphically the changes in population that have taken place in the various counties and sections of the State. Four of the counties which increased by 175 per cent and over were in the Piedmont region. Only one, Buncombe County, was located in the Highlands region, while there were none in the Upper Coastal Plain or Tidewater regions. Nine counties in the Upper Coastal Plain gained by more than 125 per cent and less than 175 per cent. Six counties in the Piedmont region and one in the Highlands were in this same category. All three counties showing population losses were in the Atlantic Tidewater section.

Two areas of rapid growth stand out. The first is made up of counties which have experienced rapid industrialization in the past forty years, stretching from Durham to Rutherford in the Piedmont region, and including Caldwell, Burke, Buncombe, and Haywood in the Highlands. The second is comprised of the principal cotton and tobacco counties in the Upper Coastal Plain. This latter area is a segment of the "Old Cotton Belt." Areas of slower growth are found in the Atlantic Tidewater, along the eastern border of the Piedmont region, and in those strictly rural counties of the Southern Appalachian system.

The speed with which the State has become urbanized since 1893³ makes it natural that the counties containing cities with a population of 10,000 or more should show rapid gains in total population. All of the counties that increased by more than 175.0 per cent had cities with a population of 10,000 or more. Iredell, Wake, and Edgecombe counties, not increasing as rapidly but at the same time having cities with a population of 10,000 or more in 1930, gained at a rate of increase only slightly under that for the

²These regions have been adjusted to county lines.

³7.2 per cent of the population was urban in 1890, 25.5 per cent in 1930.

State as a whole. New Hanover, Pasquotank, and Craven, Tidewater counties, each with a large city in 1930, likewise did not have a rate of population increase as rapid as that for the State as a whole. However, each of these counties gained at a more rapid rate than did the Tidewater area as a whole.

While industrialization may be closely correlated with urbanization, it is well to note that Forsyth, Durham, Guilford, Rockingham, Gaston, Mecklenburg, Cabarrus, Stanly, Alamance, Rowan, Davidson, Buncombe, Catawba, Rutherford, Iredell, and Cleveland counties are the most important industrial centers of the State. Each of these counties is among those which have experienced the most rapid gains in population.

The split-up of large farms, the increase in farm tenancy, and the growth of storage and exchange centers, all associated with the expansion of the cash-crop system of farming, may be assigned as causes for the rapid increase of population which we have cited for the principal cotton and tobacco counties of the Upper Coastal Plain region.

The changes in the population of these tobacco and cotton counties of North Carolina, since they comprise a major portion of the State which was in the "Old Cotton Belt," should be contrasted with the changes in the population growth of South Carolina and Georgia counties of the "Old Cotton Belt." From 1890 to 1910 these counties in all three states grew at relatively the same rate. Since 1910, North Carolina Cotton Belt counties have increased from 30 to 60 per cent, while the population for all cotton counties in South Carolina and Georgia have increased by 19.4 and 9.6 per cent, respectively.⁴

TABLE V
PER CENT INCREASE IN POPULATION OF COTTON BELT COUNTIES

	1890-1900	1900-1910	1910-1930
Wayne County, N. C.....	20.1	13.8	48.5
Wilson County, N. C.	26.5	19.8	58.8
Johnston County, N. C.	18.3	28.4	39.0
Cotton Belt Counties, S. C.	21.3	16.0	19.4
Cotton Belt Counties, Ga.	21.2	18.5	9.6

During this same period all of the North Carolina cotton counties showed an increase in farms, while the cotton counties of Georgia and South Carolina all showed decreases.⁵ This fact has been explained by the severity with which the boll-weevil devastated South Carolina and Georgia, and the more rapid recovery experienced in North Carolina, owing in part to the greater diversity of occupation in this State. Part of the increase in the population of the cotton and tobacco counties of North Carolina undoubtedly came through the immigration of farmers from the cotton areas of South Carolina and Georgia most affected by boll-weevil infestation.

Changes in the population during the decade 1920 to 1930 differ but slightly from those for the entire period 1890 to 1930. Lenoir, Wilson, Johnston, and Rockingham counties did not gain as rapidly from 1920 to 1930 as they did from 1890 to 1930. Jackson, Henderson, and Caldwell counties gained more rapidly for the shorter period. Alleghany, Yancey, Swain, and Perquimans counties, which show an increase from 1890 to

⁴Cotton counties include those counties wherein 25 per cent or more of the crop land is harvested in cotton.

⁵Migration and Economic Opportunity, Page 139.

1930, lost population from 1920 to 1930. Camden and Hyde counties, two counties that lost population over the larger period, registered slight increases during the 1920 to 1930 period. It should be added, that though the expansion of industry in the Piedmont region is largely responsible for the large population increases there, from 1890 to 1930, the growth of small truck farms from 1920 to 1930 around the urban industrial foci has given an added impetus to population increase.

GROWTH OF POPULATION BY PRINCIPAL RACES

There are two important racial elements in the population of North Carolina, white and negro, and only an insignificant proportion of other races. The foreign and mixed whites in the population are too small in number to be considered, except to point out that they have in recent years continuously decreased in proportion to the total population. As has already been pointed out, North Carolina has never been an important area of absorption of European immigrants. In fact, what foreign-born elements that have been in the population have largely come through a secondary migration from other states of the Atlantic seaboard, mainly Virginia.

The negro population of North Carolina increased faster than the white population down to 1880. Since then, the situation has been reversed. Down to 1880 in only one decade, 1830 to 1840, there is found a greater rate of growth for the white population than for the negro. Making up 73.19 per cent of the population in 1790, the white pop-

FIGURE 2

GROWTH OF POPULATION BY PRINCIPAL RACES

1790 - 1930

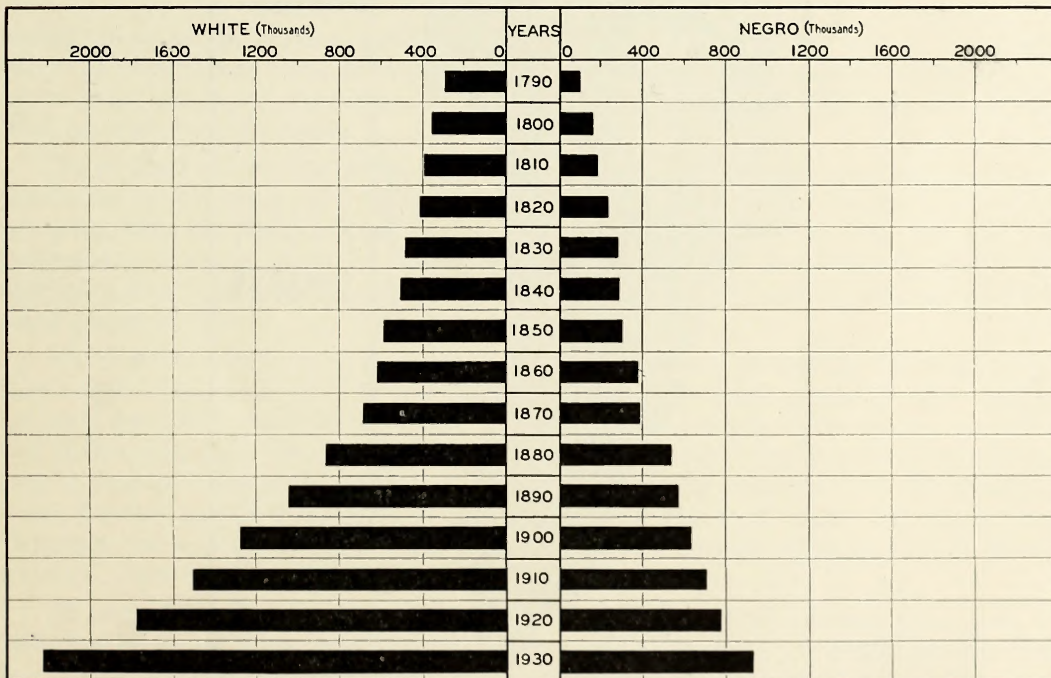


PLATE VI

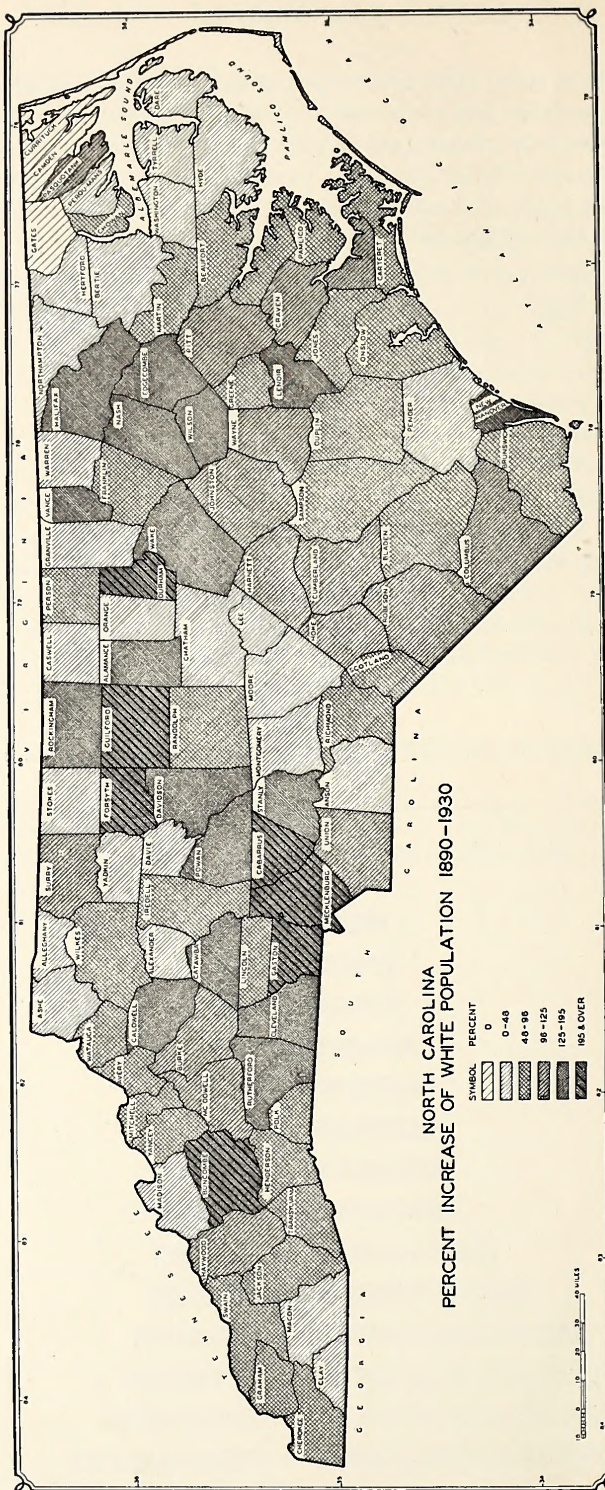
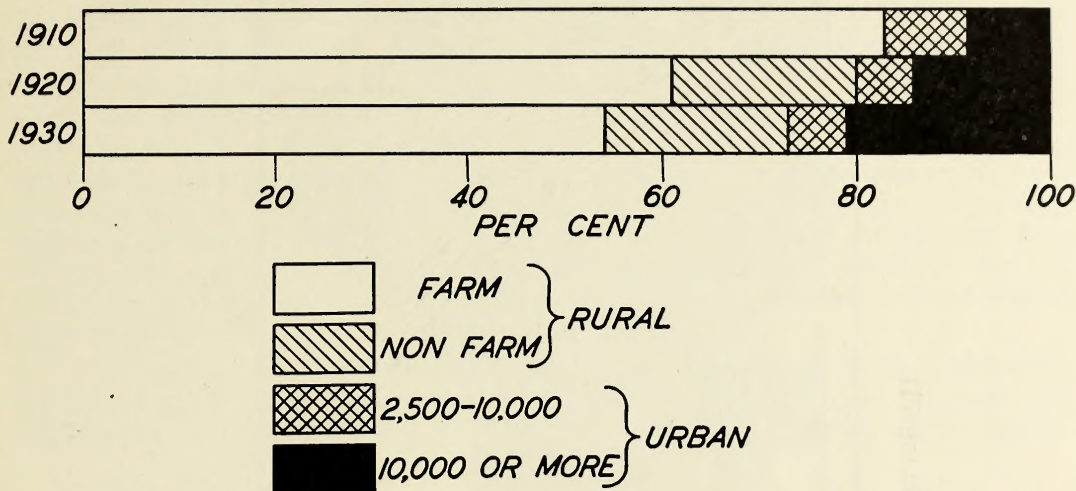


FIGURE 3

PERCENTAGE DISTRIBUTION OF NEGRO POPULATION IN NORTH CAROLINA BY TYPES OF COMMUNITIES

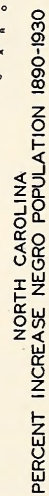


ulation decreased in relative significance to comprise only 61.96 per cent of the population in 1880. Since then, as we have pointed out, the white population has grown faster than the negro population, so that in 1930 it comprised 70.49 per cent of the total population of the State.

From 1790 to 1880 the white population increased by 200.9 per cent and the negro population by 403.8 per cent. Since 1880 the white population has increased by 157.7 per cent, while the negro population has increased by only 72.9 per cent. Perhaps the comparative increases would be understood more easily if it is stated that there were 37 negroes to every 100 white people in 1790, 61 per 100 in 1880, and 41 negroes per 100 white people in 1930.

From 1890 to 1930, while the negro population increased faster than the total population of the State as a whole in only thirteen counties, the white population had a larger rate of growth than the total population of the State as a whole in thirty-nine counties. Out of 100 counties in the State, in only twenty did the negro rate of growth exceed the rate of growth of the white population, and of these twenty counties, only a half dozen were counties that are included in that group with the most rapid rate of growth. Definitely, the negro race is becoming a less significant element of population in North Carolina, from the point of view of numbers.

In each of the major regions of the State the white rate of increase from 1890 to 1930 was decidedly larger than the rate of increase of the negro population. In contrasting these four areas, the negro population grew fastest in the Upper Coastal Plain and

[illegible]

slowest in the Atlantic Tidewater region, although, if Buncombe County were excluded, the rate of negro growth for the Highlands would be only 11.31 per cent as contrasted with the rate of growth of 20.60 per cent for the Atlantic Tidewater region. Eighty-four per cent of the negro increase in the Highlands was confined to Buncombe County. The white population grew fastest in the Piedmont region, and slowest in the Atlantic Tidewater region.

The negro population has decreased or shown the lowest rates of increase in those counties wherein the proportion of the population that was negro was least. On the other hand, those counties with more than fifty per cent or the largest ratio of their population negro are not those counties that have shown the most rapid rates of negro growth.

The most rapid gain in the negro population has occurred in counties containing large cities. From 1910 to 1930, the negro population increased in North Carolina by 31.6 per cent. In cities with a population of 10,000 or more, the negro population increased by 233.6 per cent. The negro population that was urban increased by 112.3 per cent from 1910 to 1930, and the rural negro population decreased by only 15.4 per cent. Sixty-one and seven-tenths per cent of the negro increase from 1910 to 1930 took place in cities with a population of 10,000 or more. Smaller cities lost population over this twenty-year period, while from 1920 to 1930 the rural non-farm areas showed a greater rate of negro growth than rural-farm areas.

It is evident that a large part of the negro growth in urban areas is due to migration. Should this migration continue at its present rate a further lowering of the negro rate of increase is expected, since urban life is less conducive than rural life to natural increase.

TABLE VI
PER CENT INCREASE OF POPULATION IN NORTH CAROLINA BY
PRINCIPAL RACES 1890-1930

Section	White	Negro
Atlantic Tidewater	57.14	20.60
Upper Coastal Plain	105.62	78.35
Piedmont	140.35	74.78
Highlands	86.02	51.66
Highlands exclusive of Buncombe County	71.84	11.31

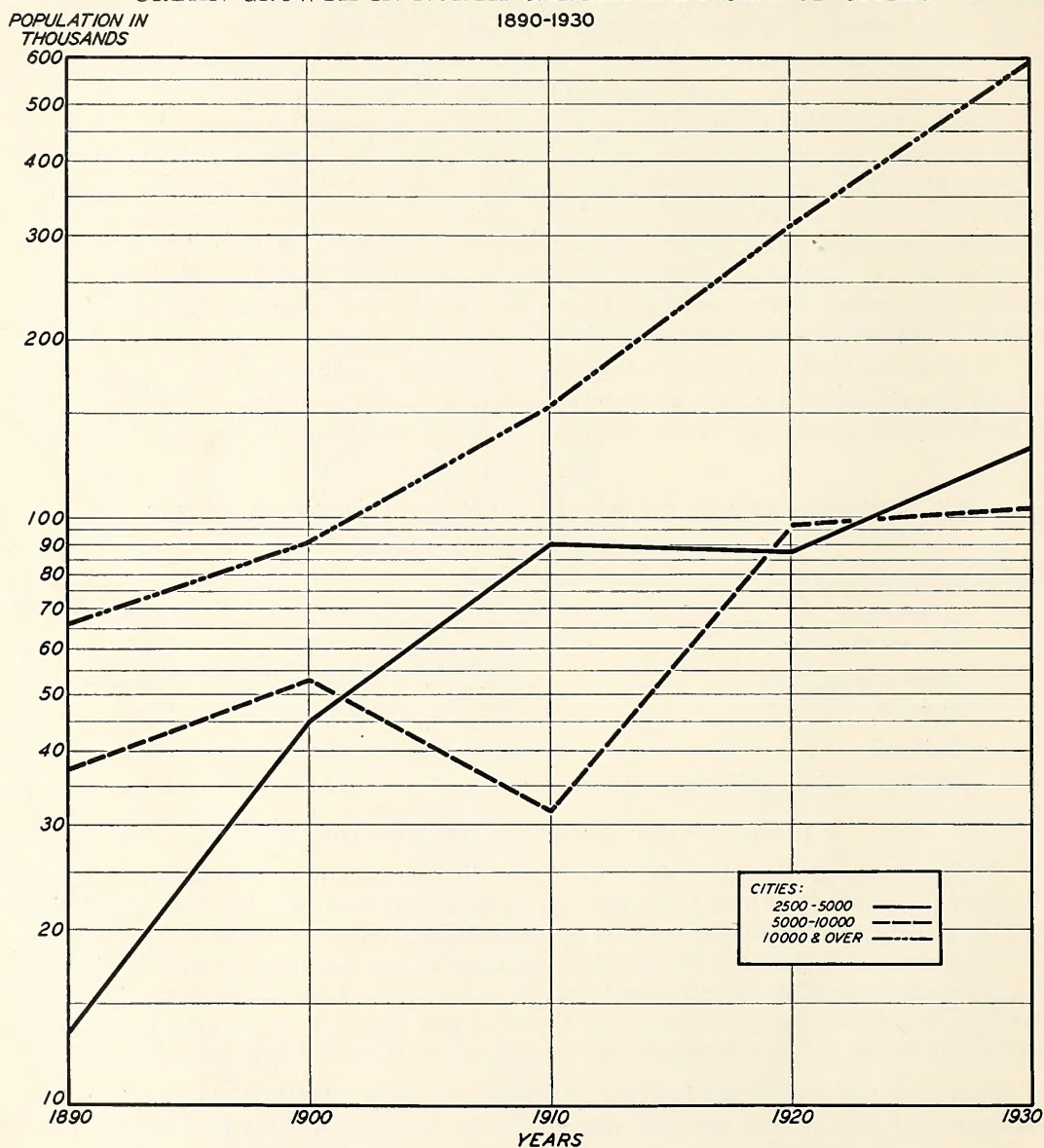
POPULATION GROWTH BY RESIDENCE

Perhaps two of the most dynamic forces in the growth of population in North Carolina since 1890 have been the rapid rate of natural increase for the farm population and the equally rapid movement of this same farm population to urban areas of industrial opportunity. In fact the movement from farm to city has been so rapid that, were it not for the migration from farms in other states of the southeast to farms in North Carolina, the farm population of North Carolina may have shown an actual numerical decrease over the last few decades—this in spite of an extremely high effective fertility.

Forty-five per cent of the increase of population from 1890 to 1930 was in urban territory, and only twenty per cent was due to an increase in farm population.

In 1890 there were only 18 urban places in the State, eleven of which were in the 2,500 to 5,000 classification. There were no places with a population above 25,000, and only four and three respectively with populations of 10,000 to 25,000, and 5,000 to 10,000. Only 7.2 per cent of the State's population was urban in 1890. Of this, more than 45 per cent was located in the four towns of Asheville (10,235), Raleigh (12,678), Charlotte (11,551), and Wilmington (20,056).

FIGURE 4
URBAN GROWTH IN NORTH CAROLINA BY SIZE OF CITIES
1890-1930



By 1930, a little more than a fourth of the population (25.8 per cent) was residing in urban places. There were eight places with a population of more than 25,000, five of which have a population of more than 50,000. There were thirteen places with populations from 10,000 to 25,000; and thirty places containing from 2,500 to 5,000 people. The seventeen places in 1930, each with populations of from 5,000 to 10,000, housed only 2,000 fewer people than all of the eighteen urban places in 1890. There were only seventeen counties in 1890 and fifty-four in 1930 wherein a part of the population was urban. There were seven counties in 1930 wherein fifty per cent or more of the population was urban, and none in 1890.

In evaluating these changes in the rural-urban composition of the population of North Carolina, it is important to note that the rate at which the urban population grew was more than ten and one-half times the rate of increase in rural districts. Thus the rural gain was 57.1 per cent as compared with 600.0 per cent in the urban districts. This is reflected in the relative proportions of the rural and urban classes in the population. While there were only 77 urban to every 1,000 rural people in 1890, by 1930 the ratio was 343 to 1,000.

The percentage increases, according to the size of the city, cast additional light upon the subject. If cities with populations of 25,000 or more are combined with those with populations of 10,000 to 25,000, there is found an increase from 1890 to 1930 of 987.2 per cent for the combined classification, that is, for cities with populations of 10,000 or more. Furthermore, a glance at the figures in Table VII show conclusively that the largest part of this increase was in the population of cities of 25,000 or more people, there being no places in this classification in 1890, and 420,142 people residing in such places in 1930. Towns with populations of 5,000 to 10,000 increased by 432.7 per cent, and those with populations of 2,500 to 5,000 increased by 159.1 per cent. In contrast, the rural population of the State grew by only 57.1 per cent from 1890 to 1930. It is evident that many small towns grew into larger places. But even the smallest urban places increased rapidly, further emphasizing the rapidity with which urbanization has taken place in the State. A distinct correlation stands out here—the population in urban places has been increasing relative to the size of the place—the largest places increasing most rapidly.

TABLE VII
DISTRIBUTION OF POPULATION IN NORTH CAROLINA, 1890-1930

<i>By Census Years, By Types of Communities</i>						Per Cent Increase
TYPE OF COMMUNITY	1930	1920	1910	1900	1890	1890-1930
Urban	809,847	490,370	318,474	186,790	115,759	600.0
Places 25,000-100,000 .	420,142	159,609	59,762	—	—	—
Places 10,000-25,000 ..	172,672	153,903	89,283	87,447	54,526	987.2
Places 5,000-10,000 ...	113,693	89,970	96,184	42,181	21,346	432.7
Places 2,500-5,000	103,340	89,888	73,245	51,162	39,887	159.1
Rural	2,360,429	2,068,753	1,887,813	1,707,020	1,502,190	57.1
Incorporate Places	275,918	240,753	218,482	148,299	98,148	181.1
Places 1,000-2,500	141,572	116,921	93,584	53,705	39,389	310.2
Under 1,000	134,346	123,822	124,898	94,594	58,759	128.6
Unincorporated	2,084,511	1,828,000	1,669,331	1,558,721	1,404,042	48.5
Rural Non-Farm	487,291	328,054	—	—	—	—
Rural—Farm	1,597,220	1,499,946	—	—	—	—

Even within the rural population there has been the tendency for people living in the incorporated non-agricultural areas to increase faster than the number residing in unincorporated non-farm areas or farm areas. Incorporated places with populations of 1,000 to 2,500 increased from 39,389 in 1890, to 141,572 in 1930, for a percentage gain of 310.2. Incorporated places with populations under 1,000 increased from 58,759 in 1890, to 134,346 in 1930, or by 128.6 per cent. This was in contrast to a percentage increase of 48.5 per cent for unincorporated places.

Within the unincorporated places the rural-farm population from 1920 to 1930 grew by only 6.5 per cent, while the non-farm unincorporated population increased by 48.5 per cent, or by as much as the entire unincorporated population from 1890 to 1930.

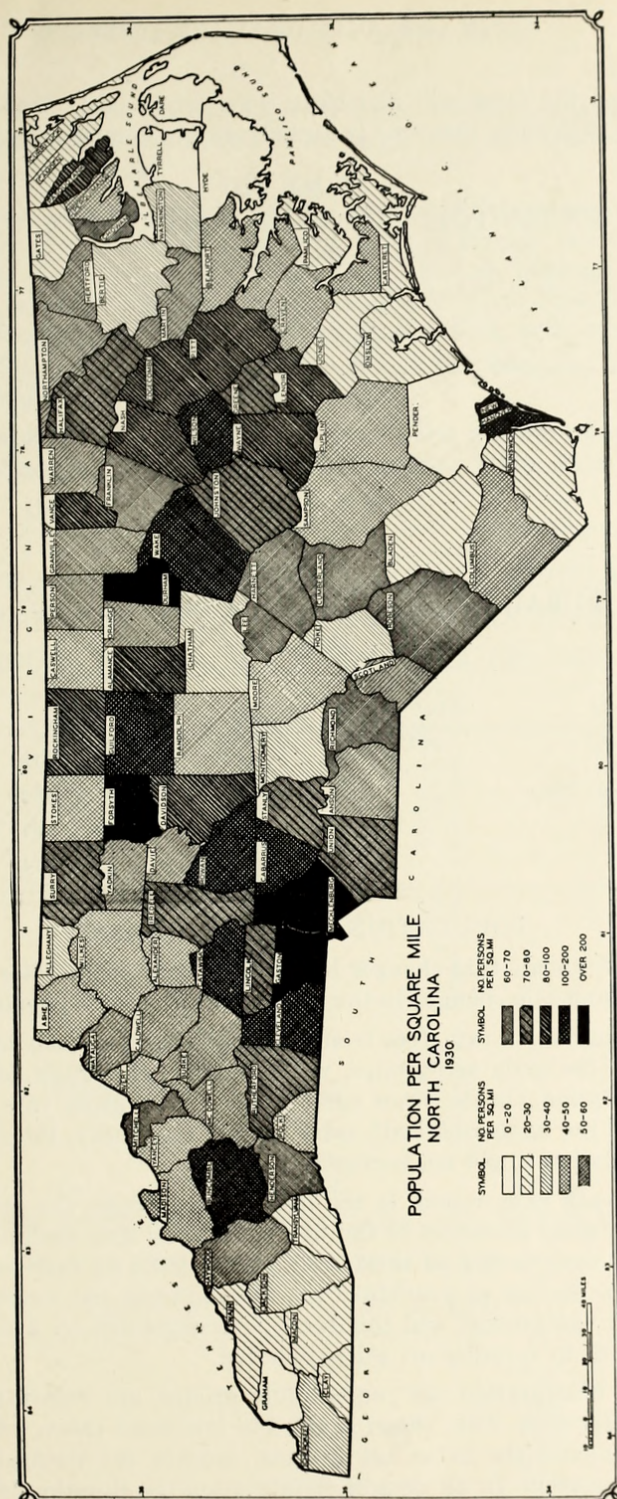
In 1890, urban places for the most part were located in the Piedmont region and along the Atlantic coast line in the Tidewater region. The former were small industrial nuclei, the latter important shipping points. Four urban places, two being of the larger variety, were located in the Atlantic Tidewater region, and two in the Upper Coastal Plain. Eleven urban places, including four of the larger class, were located in the Piedmont region. Asheville, the only urban center in the Highlands region, contained 10,235 people. There was an increase of 27 places in the Piedmont region; 14 in the Upper Coastal Plain; 6 in the Highlands region; and only 3 in the Atlantic Tidewater area, from 1890 to 1930. Six of the eight places with populations of 25,000 or more in 1930 were in the Piedmont region.

To be specific, the urban population of the Piedmont region grew from 62,590 in 1890, to 539,154 in 1930. It was in this region that the majority of the urban population of the State was located both in 1890 and 1930. Fifty-four per cent of the urban population was here in 1890, sixty-seven per cent in 1930. The Upper Coastal Plain, another region where the urban population gained rapidly in relative significance, contained 8,239 urban people in 1890, the smallest number of any region in the State. In 1930, the urban population in this region numbered 129,226, representing sixteen per cent of the State's urban residents. The Tidewater region, while showing an eighty-seven per cent increase in urban population, contained only eight per cent of the urban population of the State in 1930, as contrasted with thirty per cent in 1890. The Highlands region just barely held its own in this respect, containing nine per cent of the urban population of the State both in 1890 and 1930. The Piedmont region had the most urban people in 1890, the Upper Coastal Plain the least. In 1930 the Piedmont region still had the largest urban population, while the Upper Coastal Plain had the next largest and the Tidewater area the least.

The rural population increased fastest in the Upper Coastal Plain and slowest in the Tidewater region. The percentage increase from 1890 to 1930 was 71.7 in the Upper Coastal Plain, 32.9 in the Tidewater, 54.6 in the Piedmont, and 50.3 in the Highland region.

The fact that the major part of population increase in North Carolina has consistently for the past few decades been urban growth, leads one to believe that the urban population will continue to grow at the expense of rural areas. Perhaps this urban growth will proceed more slowly for a time, as it has been for the past few years; but it may be predicted that with the passing of the economic depression, those people who have

PLATE VIII



been backed up on the farm will find their way urbanward. Evidences of population movements since 1933 show that this is already slowly commencing.

TABLE VIII
GROWTH OF URBAN POPULATION OF NORTH CAROLINA, BY REGIONS
1890-1930

Region	1890		1930	
	Number	Per Cent State Total	Number	Per Cent State Total
Tidewater	34,695	30	64,886	8
Upper Coastal Plain	8,239	7	129,226	16
Piedmont	62,590	54	539,154	67
Highlands	10,235	9	76,581	9

TABLE IX
GROWTH OF RURAL POPULATION OF NORTH CAROLINA, BY REGIONS
1890-1930

Region	1890	1930	Per Cent Increase
Tidewater	186,173	247,413	32.9
Upper Coastal Plain	415,080	710,555	71.7
Piedmont	660,794	1,021,587	54.6
Highlands	240,141	360,874	50.3

POPULATION GROWTH AND AGE

It is reasonable to say that changes in the birth and death rates and migration are the factors which underlie changes in the age composition of a population.

Obviously, a high birth rate, free from the nullifying character of a correspondingly high death rate in the early age groups, would make for a high proportion of young people in the population. On the other hand, a declining birth rate would reduce the proportion. Should the birth and death rates remain stationary, the proportion of young people in the population would not perceptibly change.

A declining death rate, would, in the beginning, increase the proportion of infants and young people, since advances in the life expectancy and declining death rates are largely the results of a saving of child lives rather than an increase in the life span. Later, however, the saving of youthful lives will increase the number of survivors in the middle and old age groups; and this fact, if accompanied by a declining birth rate, would be most ideal in forming an old population.

In an area of immigration our young adult groups are enlarged, depending upon the extent of immigration. This, when coupled to low death rates, would in the long run tend further to expand the older age groups, beyond the natural conditions of an entirely native population. In an area of immigration the situation is reversed.

North Carolina is an area wherein high birth and death rates are maintained. This may be largely ascribed to the way of life of its large rural and negro population, and that of its isolated mountain folk.

It has already been pointed out that North Carolina is not an area of immigration, that North Carolina has never been an absorption point of foreign immigrants, and that there has been a net loss of population in the State through internal migration. This being so, it would be expected to find that the population of North Carolina was relatively youthful. The State should contain a high proportion of infants and young people, a normal proportion of those in the middle ages, and a few in the older age groups. A survey of the relevant statistics will serve to bear this out.

There has been a gradual yet steady trend during the past 40 years toward having less young people and more older people in North Carolina. While 54.2 per cent of the

TABLE X

AGE DISTRIBUTION OF NORTH CAROLINA POPULATION
SHOWN AS PER CENT OF TOTAL POPULATION IN SPECIFIC AGE
GROUPS FOR EACH CENSUS YEAR 1890-1930

Age Group	1930	1920	1910	1900	1890
Total	100.0	100.0	100.0	100.0	100.0
0-4	12.3	14.0	15.1	15.0	14.4
5-9	13.5	13.9	13.4	13.9	14.7
10-14	12.1	12.5	12.1	12.4	13.7
15-19	11.4	10.5	11.0	11.3	11.4
20-24	9.6	9.1	9.5	9.8	8.7
25-29	7.6	7.3	7.6	7.1	6.5
30-34	6.2	5.9	6.0	5.4	5.9
35-44	10.8	10.7	9.4	9.2	9.7
45-54	8.1	7.5	7.3	7.7	6.9
55-64	4.7	4.7	4.9	4.4	4.3
65-74	2.5	2.8	2.5	2.4	2.4
75 and over	1.1	1.1	1.0	1.0	1.2
Unknown	0.1	0.1	0.2	0.3	0.2
0-19	49.3	50.9	51.6	52.6	54.2
20-44	34.2	33.0	32.5	31.5	30.8
45-64	12.8	12.2	12.2	12.1	11.2
65 and over	3.6	3.9	3.5	3.4	3.6
Unknown	0.1	0.1	0.2	0.3	0.2

TABLE XI

AGE DISTRIBUTION OF NORTH CAROLINA POPULATION
AS COMPARED WITH OTHER STATES AND
THE UNITED STATES — 1930

	0-19	20-44	45 years and over
United States	38.8	38.3	22.8
Pennsylvania	39.4	37.4	23.0
Illinois	34.9	41.3	23.9
Texas	42.6	38.9	18.4
California	30.4	42.0	27.4
North Carolina	49.3	34.2	16.4

population was under 20 years of age in 1890, only 49.3 per cent of the population was under 20 in 1930. The proportion of the population over 65 years of age was the same in 1930 as it was in 1890.

The relative decrease in children and young people can be ascribed almost entirely to the general decrease in the birth rates that has been experienced throughout the nation. In fact, the relative importance of young people in North Carolina would undoubtedly be less than it is were it not for the negative migration of people in the next older age groups. Advances in sanitation and health which have lowered the death rates in the State, have made it possible for more people to survive into maturity from the younger age groups.

While the decreasing numerical importance of the child-youth group in North Carolina has been pointed out, it can be readily seen from Table X that the population of North Carolina is still composed of a high proportion of persons under 20 years of age. At the same time, the proportion of persons in the main productive and reproductive ages (20 to 44) and older, is relatively small. The nation as a whole has a 28 per cent greater proportion of its population 45 and over than North Carolina. This State, on the other hand, has a 27 per cent greater proportion of its population under 20 than the nation as a whole.

It is evident that, though the birth rate is falling over the entire nation, North Carolina will continue to show a high proportion of young people or an age distribution associated with a growing population, for some years after the population of the nation as a whole has ceased to grow.

TABLE XII

AGE DISTRIBUTION OF NORTH CAROLINA POPULATION
BY PRINCIPAL RACES — 1930

Age Group	White	Negro
0-4	12.3	12.5
5-9	13.2	14.2
10-14	11.7	12.8
15-19	10.9	12.5
20-24	9.3	10.3
25-29	7.5	7.6
30-34	6.4	5.6
35-44	11.1	10.0
45-54	8.4	7.6
55-64	5.1	3.9
65-74	2.8	1.9
75 and over	1.2	0.9
Unknown	0.1	0.1
0-19	48.1	52.0
20-44	34.3	33.5
45-64	13.5	11.5
65 and over	4.0	2.8

There are certain differences in the age distribution between certain classes of the population of the State that deserve mention here. The age distribution in the white population and negro population is different. Likewise there are large differences in age distribution between the urban, rural non-farm, and rural-farm population in the State.

A little over 48 per cent of the white population is under 20 years of age, while 52 per cent of the negro population is in this age classification. Approximately 17.5 per cent of the white population and only 14.3 per cent of the negro population is 45 years of age and over.

Over 54 per cent of the rural-farm population is under 20 years of age, as contrasted with 47.6 per cent and 41.0 per cent of the rural non-farm and urban populations, respectively. Forty-two and a half per cent of the urban population is in the main productive age groups (20-44), while only 36.7 per cent of the rural non-farm and 28.7 of the rural-farm population are in this age group.

TABLE XIII
AGE DISTRIBUTION OF NORTH CAROLINA POPULATION
BY TYPE OF COMMUNITY—1930

Age Group	Urban	Rural Non-Farm	Rural—Farm
0-4	10.2	13.1	13.1
5-9	11.2	13.4	14.7
10-14	9.5	10.8	13.9
15-19	10.1	10.3	12.5
20-24	11.3	10.2	8.5
25-29	10.0	8.7	5.8
30-34	8.1	6.9	4.9
35-44	13.1	10.9	9.5
45-54	8.7	7.6	8.1
55-64	4.5	4.4	4.9
65-74	2.2	2.4	2.8
75 and over	0.9	1.1	1.2
Unknown	0.1	0.1	—
0-19	41.0	47.6	54.2
20-44	42.5	36.7	28.7
45-64	13.2	12.0	13.0
65 and over	3.1	3.5	13.0
Unknown	0.1	0.1	—

EXPECTED POPULATION IN 1940

Throughout this chapter consideration has been given certain elements of population growth in North Carolina to 1930. Probable future trends have hardly been mentioned. In conclusion there will be proposed an estimate of population that will be in the State in 1940. It should be borne in mind that this estimate is based upon the past, and can be nothing more than a rough guess.

The method of computation used entails two steps. First, the survival rates of whites and negroes, male and female, as worked out by C. Horace Hamilton in *Rural-*

Urban Migration in North Carolina, 1920-1930, were utilized to estimate the survivors of the 1930 population in 1940. This presupposes a continuation of death rates as they existed from 1920 to 1930, and likewise a balance of migration in and out of the State as was roughly the case between 1920 and 1930. Then, by use of birth statistics, after allowing for an under-count of 15 per cent, and infant mortality, an estimate is gained of the population in 1940 under ten years of age.

From this method, we locate 2,652,000 persons ten years of age and over, and 835,000 persons under ten years of age in North Carolina in 1940. Therefore, from a population of 3,170,276 in 1930, we may expect an increase of close to 320,000 persons to a population of 3,487,000 in 1940. Since migration is apt to be toward North Carolina, owing to a return of those who left the State before the depression, and since the death rate has continued to fall since 1930, this estimate is more likely to be low than high.

CHAPTER III

THE GOVERNMENT OF NORTH CAROLINA: ITS STRUCTURE AND SERVICES

In keeping with the universal trend, North Carolina has expanded the structure of its government in all of its phases and multiplied the services which government is now called upon to perform for its citizens. This growth and expansion has resulted in an increasing consciousness of our relations with and dependence upon our various governments. This relationship is sometimes regarded as restrictive and inhibitory when the individual action would be contrary to its regulation, but far more frequently the individual looks to his government for services which, in simpler modes of living, he would expect to do for himself.

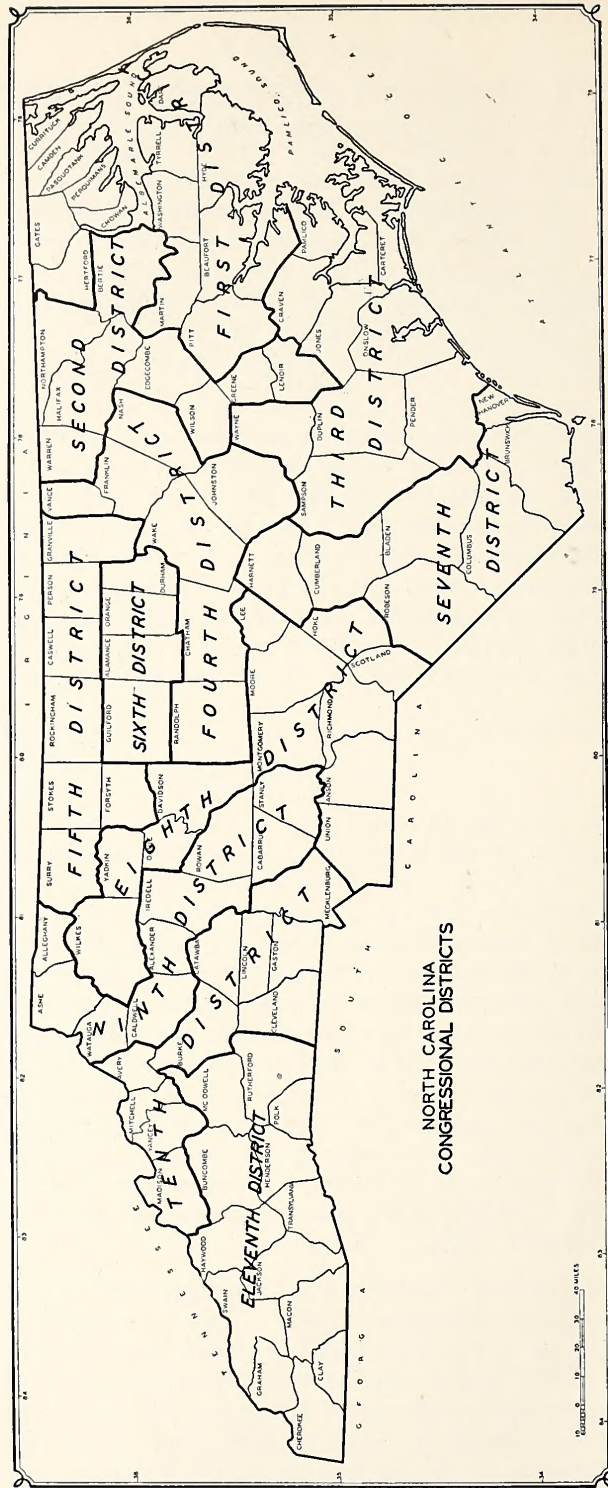
North Carolina has gone far on the road of service to its citizens, and this chapter is presented to set forth as briefly as the subject will permit the structure of State and local government and the manifold services which each renders. Here is the machinery and here the product of the expenditure of the public revenues. If this be done with a high sense of civic responsibility, with efficiency and real vision of the results desired in the establishment of a richer and more safe civilization, then it is well done. North Carolina is justly proud of the long established tradition of fidelity to public trust which has been manifested in its public servants. The courage with which all have continued to serve during the trying day so recently passed will always stand in proof of this tradition.

THE STRUCTURE OF GOVERNMENT STATE GOVERNMENT

North Carolina, like the United States and each of its units, is a constitutional democracy. Organization of the three grand divisions of government—legislative, executive, and judicial—is set out in the State Constitution. The legislative department is called the General Assembly, and consists of two houses: the Senate, with fifty members; and the House of Representatives, with a hundred and twenty members. Senatorial representation is based upon population, election being by districts of one county or several contiguous counties. House representation is based upon the identity of counties, each of the one hundred having one seat, and the more populous ones, two or three seats. Both Senators and Representatives serve two-year terms, meeting in Raleigh biennially for regular sessions, early in January of each odd-numbered year. Compensation is paid for travel expense and for sixty days' service at the capitol. Special sessions may be called by the Governor for twenty days' duration. The Lieutenant-Governor is *ex officio* president of the Senate, and the presiding officer of the House is elected by each session. Ninety-odd standing committees of the two houses prepare bills for passage, bills based upon specialized study by each group.

To choose North Carolina's legislative agents, there are one and a half million persons of principal races over twenty-one years of age. Less than half that number cast a ballot for presidential electors in 1932, and less than a third voiced a vote on the repeal issue of that same year. Criminal and mental disfranchisement, together with illiteracy, contribute to the apparently small size of the actual electorate. The individual's neglect is possibly an additional factor. It should be noted that North Carolina's actual voters recently have increased more rapidly than its eligible voters.

PLATE IX



The executive department is designated by the Constitution as consisting of the Governor, Lieutenant-Governor, Secretary of State, Auditor, Treasurer, Superintendent of Public Instruction, and Attorney General, all of whom are elected by popular vote for a term of four years. Custom dictates that the Governor, "in whom shall be vested the supreme executive power of the State," be chosen alternately from the east and the west.

A Council of State is set up in the Constitution, and is composed of the Secretary of State, Auditor, Treasurer, and Superintendent of Public Instruction, all *ex officio*. The Attorney-General is legal adviser to the executive department. The Council's broad duty is to advise the Governor in the execution of his office generally. Together with the Governor, the Council acts upon any problem of the State's property interests and internal improvements.

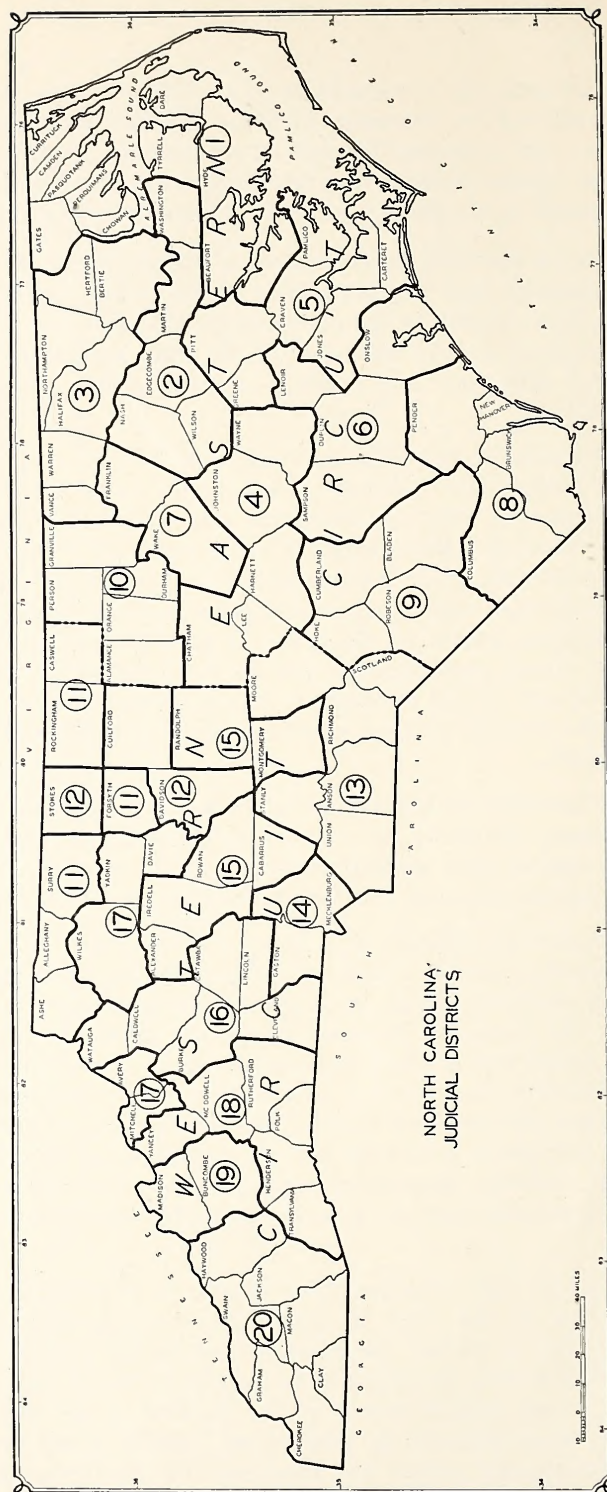
The Governor's executive power is confined principally to pardon and reprieve, and to command of the militia. His "cabinet" is not appointed by him, and the Council of State has restrictive powers. His administrative power embodies a broad range of appointments and servings *ex officio*, together with removals as permitted by statute. His legislative power revolves about the Governor's duty to inform the General Assembly on matters of public interest and to summon special sessions. Unlike all other states in the Union, North Carolina grants its Governor no possible veto of legislation. Judicial power is limited to minor appointments and to court administration: to appointing Justices of the Peace and special emergency Superior Court Judges; to filling Supreme Court vacancies in the interim between elections; and to calling special terms of court and transferring judges.

The Lieutenant-Governor is president of the Senate, and succeeds to the office of Governor in case of absence, incapacity, or vacancy in that office. The other executive officers of the State will be treated with especial regard to their services, at a later juncture, as will the creating of the executive and legislative and administrative departments.

The judicial department consists of a Court for the Trial of Impeachments, the Supreme Court, Superior Courts, Courts of Justices of the Peace, and other statutory courts inferior to the Supreme Court. In cases of impeachment, the Senate constitutes itself a trial court; the House of Representatives, the prosecutor. In cases against the State, the Supreme Court has original jurisdiction; on all matters of law or legal inference, appellate jurisdiction. This court is composed of a chief justice and four associates, elected for eight years and required to hold two sessions annually in Raleigh. By statute, three members constitute a quorum for the rendering of decisions by a majority. An amendment was recently adopted by the electorate whereby the Constitution is changed to increase the court from five to seven members and to permit the court to sit in divisions.

Superior Courts are the principal trial courts of North Carolina. Two judicial divisions are designated by law, with ten districts in both the eastern and the western. A Superior Court judge is elected for each district by the popular vote of the whole State, but the judge must be a resident of the district for which he is elected. The judge serves an eight-year term, holding courts of the districts in his division in rotation. It is required that two terms of court be held in each county every year with additional terms as needed. Emergency judges are appointed by the Governor, who also orders

PLATE X



special terms as he deems necessary. A Solicitor is elected for a four-year term as prosecuting officer for each district. A Clerk is chosen likewise, his principal power being in his final jurisdiction in special proceedings and probate matters.

Justices of the Peace comprise another constitutional group of judicial officers. They are elected by a township for two years, or appointed by the Governor for four years. On demand, they hear causes involving civil, tort, and criminal cases up to two hundred dollars, fifty dollars, and thirty days imprisonment, respectively. A fee is charged.

Since 1919, North Carolina's judicial system has become complex. Up till then, the system involved only the Supreme Court, the Superior Courts, and Justice of the Peace and Municipal Recorder's Courts. An increasing population and its complexity of social problems demanded an enlarged structure. As an alternative to expansion along horizontal lines, the State chose to create new courts. To relieve the congested Superior Court dockets, six sorts of County courts and several types of Municipal courts have been instituted. There remains, of course, the possibility of appeal through the Superior Court to the Supreme Court of the State.

The County courts now authorized are these: County Criminal Court, County Civil Court, General County Court, District County Court, and County Recorder's Court. These courts are permissible upon the petition of the Board of County Commissioners.

The law has made these the possibilities for separate courts for cities: Municipal-County Recorder's Court, permissible upon the joint action of the Board of County Commissioners and the governing body of a municipality of more than two thousand inhabitants; Municipal Recorder's Court, having to do principally with violations of city ordinances; Domestic Relations Court, in cities of twenty-five thousand or more; Juvenile Court, as a branch of the Superior Court and in connection with the Welfare Department of the State, county, or city; and Justice of the Peace Courts.

COUNTY GOVERNMENT

Whereas the states *formed* the Union and surrendered certain absolute powers for certain substantial powers, the counties *were formed* by the states and were granted specific, limited powers of performing the primary functions of local government. County authority in North Carolina is vested in a Board of Commissioners, chosen by the electorate of each county for a two-year term. The number of Commissioners, constitutionally stipulated at five, has been varied by the General Assembly by special local legislation. The Board is legislative in so far as it makes alternative decisions as allowed by State law. The Register of Deeds, a constitutional officer, is *ex officio* clerk of the Board of County Commissioners.

Administrative concerns of the county have been diminished by the State's assumption of all public schools and highways, large services in point of personnel and finance. There remains to the county, however, the important duty of co-operating with the various State departments, supplementing their organization to meet local needs. Too, there is the expanding tendency of local governments to undertake broader social services than have been comprehended as yet by larger units of government. The administrative task belongs to the Board of Commissioners, whose specific services will be noted later with our consideration of departmental service generally. One may readily infer

the wide variation in county administrative problems when one considers the wide disparity existant in point of area, population, and density. Of the one hundred counties, the averages are: an area of 488 square miles; a population of 31,703; and a density of 65 persons per square mile. But the range is wide, from the largest to the smallest: Robeson has 990 square miles, and Chowan 165; Guilford has 133,010 inhabitants, and Tyrrell 5,164; Forsyth has a population density of 287.8 per square mile, and Tyrrell 13.2. Average county area runs highest in the Coastal Plain section and lowest in the Appalachian Highlands; population and density, highest in the Piedmont section and lowest in the Tidewater.

The Sheriff is the executive officer of the county. His office is designated in the Constitution as elective, and his province is to enforce, with the aid of the constabulary and tax officials, the rulings of the Board of Commissioners. Other elected county officials are the Register of Deeds, Treasurer, Surveyor, Coroner, Constables (by township), Clerk of Superior Court, Justices of the Peace, and a few statutory officers. A large appointive power rests by statute with the Board of Commissioners, and State departments designate the remainder of county official personnel. Payment of county officials is tending to change from a fee to a salary basis.

The judicial department of the county has been alluded to in the above treatment of the State judiciary. The newer county courts were seen to be permissible to the petition of the Boards of County Commissioners. In the case of Recorders' Courts and Juvenile Courts, the county often acts in conjunction with a sizeable municipality within the county domain. The Clerk of the Superior Court is the most important judicial officer of the county, in view of his final jurisdiction in certain special matters. The district Superior Court, as it meets semi-annually in the county-seat, is the heart of both civil and criminal jurisdiction in the county.

CITY GOVERNMENT

General laws of incorporation have superseded special charters organizing municipalities in North Carolina. The Municipal Corporation Act of 1917 outlines the four principal types of city government in the State, of which types combinations and variations are rather universally in effect. The effect of the Act is broad, affecting more than a third of the State's population. Some measures of diversity in character of populous places in the State might indicate the wisdom of our flexible city structure.

Of the approximately five hundred incorporated places identified, populations range from nearly ninety thousand in Charlotte to ten persons in Bellview. Two thirds of those places have a constituency of less than a thousand. Twenty-one incorporated places have more than ten thousand inhabitants, totalling more than half a million people, about a sixth of the State's population.

It is interesting to note incorporated places in their relation to counties. Five county-seats are unincorporated, and thirty-one are not the largest towns in their counties. Five counties embrace unincorporated places of more than twenty-five hundred inhabitants, two counties sharing such a community of more than twelve thousand.

The four plans of municipal government have certain common characteristics. The Council is the legislative department, and the Mayor the executive head of the municipi-

pality. The Council is also the administrative agent of the town or city, except in the managerial scheme, which makes city employees answerable directly to the Manager, a Council appointee. The government is elected biennially and receives compensation for official services. Except in the commission form, the Council acts as a unit in administrative matters.

Structural variations appear in the line of responsibility to the people and in the number of Council members. Under three plans, the voters choose the mayor directly; under one plan, he is chosen by the Council from its members. Two plans offer a sliding scale of Council membership in accordance with the population of the municipality; two have a constant number.

The Council-Manager plan is the most advanced in structure and is in force in eighteen cities of the State, ranging in population from Charlotte's 82,675, to Chapel Hill's 2,699, and dating back, in the earliest instances, to 1913 (Hickory and Morganton).

For places with more than ten thousand inhabitants, there are interesting facts available. The land area of the twenty-one towns concerned ranges from 12,390 acres in Charlotte, to 922 in Kinston. The number of members on the City Council in these places ranges from three in Raleigh and Wilmington, both of which have a commission form of government, to thirteen in Rocky Mount, with a council-manager form. Charlotte's city personnel, at 590, is largest of the group; and Thomasville's, at 45, the smallest.

The Municipal Recorder's Court was the first inferior court provided for by the General Assembly under the Constitution's judicial section. It remains the principal city judiciary, and concerns itself with enforcement of city ordinances in and about the municipality. The increase of city courts has been mentioned before, with reference to the Municipal-County Recorder's Court, the Domestic Relations Court, the Juvenile Court, and other special courts.

Our government has been seen now in structural relation to the rules—State, County, City. The structure as agent provides the individual with services so profuse that they tend to become an important aspect of the life of the North Carolina citizen. Let us look at the services, how effectuated and how effective.

EDUCATION

The benefits accruing from public education are not confined to certain groups or individuals, but are the inviolable possessions of all the people as a common heritage of democratic government. An enlightened citizenry, aware of the workings of government and society, and capable to the fullest possible extent, of a wise enjoyment of life and liberty, is one of the major goals of any political division; and is a prerequisite to all that any government may ever hope to accomplish.

The training of a useful citizenry has always been a major concern of North Carolina. This is attested to not only by the stands taken by her progressive Governors but also by the very real progress attained in the improvements in her system of public education. The previous trends toward centralization have culminated in a State-supported system in which lesser units of the county, the city, or the special district, and

the people themselves still remain important co-operating factors and retain the administrative functions connected with the State-wide system of public education. The six-months term, formerly provided for by law, has been lengthened to eight months by the General Assembly, this full term to be financed by the State and lengthened at the will of each local unit. High standards of teacher-efficiency and of building-adequacy have been maintained, even throughout the worst part of the depression.

Fully realizing the importance of education, the framers of the State Constitution provided for the nucleus around which the present system operates. The Superintendent of Public Instruction, elected for a term of four years, performs, together with his staff, a multitude of services as chief educational officer of the State. To county and city superintendents of schools he offers co-operation toward the solution of their many problems in organization, transportation, building facilities, teacher training, and finances. To institutions of higher education he offers assistance in matters pertaining to teacher training and in other problems affecting both the colleges and the department. To parents and other interested citizens he offers assistance in organization and financial problems. In addition, the Superintendent's office collects and disseminates information pertaining to the school system and performs a variety of miscellaneous services as well.

Also provided for by the Constitution is the State Board of Education, an *ex officio* body which manages the Literary Fund and passes, subject to the approval of the General Assembly, regulations in relation to the school system and the State Educational Fund.

What the Constitution provided for as the basis of an efficient system of public education, the people, through the medium of the General Assembly, have added to by degrees. The natural interest in agriculture, home economics, trade, and industry is fostered and directed by the Board of Vocational Education. The need for wise decisions in the selection of textbooks has led to the creation of Textbook Commissions, both for the grammar schools and for high schools. In 1935, the Textbook Rental Commission was established for the purpose of achieving economies in the purchase and distribution of textbooks and supplies and establishing uniformity in rental charges.

Of primary importance to the achieving of all that an efficient system means, is the State School Commission, created in 1933 and consisting of fifteen members appointed by the Governor, and serving in some cases *ex officio*. The services which it performs are in the interests of economy, equality, and efficiency; and consist of the redistricting of counties into a convenient number of districts, the classification of districts and city administrative units, the allotment of teachers to the school districts, the fixing of a salary schedule for teachers and principals, the making of rules governing costs of operation and of allotments covering the same, the control of transportation facilities, and the approval of supplementary county budgets. Some of these duties previously were exercised by the State Board of Equalization.

As supplementary agencies, two additional bodies have been created recently. The North Carolina State Thrift Society, established in 1933, offers valuable service in the teaching and practice of thrift. The State Board of Commercial Education, created in 1935, passes on the application of any business or commercial school to operate within the State, and generally supervises such schools.

In co-operation with all these State agencies, the lesser political units round out the system of public school education through the exercise of administrative powers. In each county a Board of Education, nominated by the people and appointed by the General Assembly, has general control over the educational affairs of the county unit, supplementing in these matters the State School Commission. The Board also appoints the County Superintendent of schools, who is the chief administrative officer for the county.

Similarly, for the city administrative units, of which there are sixty-nine, Boards of Trustees or Boards of Education are elected or appointed, with powers over budgetary affairs, their decisions being subject to the approval of the County Board of Education and County Board of Commissioners. A City Superintendent, appointed by the City Board of Education, acts as chief administrative officer for the city.

Finally, special districts, approximately 812 in number, are administered by local committees, appointed by the County Boards of Education. These committees select the teachers and principals, subject to the approval of the County Superintendent and the County Board of Education, and have general custody and care of the school property in the district.

In addition to the services performed in grammar and high school education, the State operates various institutions of learning described more fully hereafter. Supplementing the work done by these many agencies, there are additional agencies in library and general informational service. The State Library acts as depository for government publications of Federal and State units. The Law Library collects legal treatises, law reports, and other related publications. The Historical Commission collects historical data pertaining to North Carolina and issues publications devoted to the State's history; and also the Commission has control of the Legislative Reference Library, which collects general information for the use of the General Assembly and county and municipal officers. Finally, the Library Commission provides assistance in the establishment and maintenance of libraries throughout the State.

PROTECTION TO PERSON AND PROPERTY

North Carolina adequately performs that primary function of government-as-agent, the protection of person and property against infringement and injury. However, the State must go further than this. Prevention of crime in all its forms and the reformation of criminals are recognized as primary steps in the solution of the problem of protection. North Carolina performs a broad, universal service in the field of personal and property protection.

The Adjutant-General's Department, chief State agency in this connection, is headed by an appointed officer and consists principally of the National Guard, performing the service of general protection in emergency, especially on strike duty. The National Guard consists of 58 units, with a maximum strength in personnel of 275 officers, 5 warrant officers, and 3,220 enlisted men, a total of 3,500. The strength fluctuates between 3,300 and the maximum, and on the last day of 1935 totalled 3,346. Expenditures for the fiscal year 1934-35 were \$166,061.84.

But the State's services with this regard do not end with that protection just mentioned. The rehabilitation of the reformed criminal and his return to society as a useful citizen is effectuated whenever possible. The Commissioner of Paroles and the Advisory Board of Paroles, the latter created in 1935, assist the Governor in the performance of his pardon and parole powers. In each of the years 1933 and 1934, approximately 500 paroles were granted, 40 were revoked, and 5 pardons given.

In 1935 the General Assembly established within the Revenue Department an administrative unit known as the Division of Highway Safety. This Division has the duty of examining applicants and issuing licenses to drivers, and directs the work of the State Highway Patrol. This Patrol now numbers 121 men and officers, who, during the year ending September 30, 1936, travelled over 3,700,000 miles, investigated 3,204 accidents. They recovered 285 stolen cars, and made nearly 30,000 arrests. The value of property recovered, fines and costs paid during the year amounted to \$606,771.67. They also collected revenue amounting to \$696,849.47. A modern radio control system is now being set up, with several broadcasting centers. Each motorcycle and car will be equipped with receiving sets, and the Patrol will be under direct control of headquarters at all times.

County participation in protection is provided for almost entirely by the Constitution. The Sheriffs, Constables, Coroners, Clerks of Superior Court, all elective officers, perform duties connected with the judicial system, as does also the Public Administrator, appointed by the aforementioned Clerk.

In the cities, the police department prevents commission of offenses against the laws of North Carolina and against the ordinances and regulations of the city, preserves good order, and protects the individual as well as his property against injury. In co-operation with police departments, the State Bureau of Identification disseminates information on criminals and the causes and costs of crime. The fire department similarly performs a service which speaks for itself.

SERVICE TO CITIZENS AS CONSUMERS

Just as the individual requires protection against crime, so also does he require protection as a consumer of whatever services or goods he may purchase. Regulation of trade, industry, and the professions in the best interests of society, examination and licensing of those who desire to manufacture or market services or goods, and the education of the people through assembled information are all a part of the State's function as a well-rounded division of government. State agencies and the agencies of the subdivisions thus aim at protection to the interests of all concerned.

The Utilities Commission of three members, derived in 1933 from the Corporation Commission, is headed by the Utilities Commissioner. It requires not only that public utility corporations furnish service to the citizens of the State but that they charge reasonable rates therefor.

The Insurance Department which, also in 1933, developed out of the Corporation Commission, is headed by the Insurance Commissioner. This department protects the purchase of insurance through the enforcement of the insurance laws and of building codes and inspection laws.

Many miscellaneous examining and licensing boards serve the consumer. Most of these operate for the benefit of the health of the citizen, laying down regulations which are strictly enforced and, for the most part, willingly lived up to. These boards, whose purposes speak for themselves, are listed as follows:

PERSONAL SERVICE REGULATION

- Board of Medical Examiners
- Board of Embalmers
- Board of Veterinary Medical Examiners
- Board of Pharmacy
- Board of Osteopathic Examination and Registration.
- Board of Examiners in Optometry
- Board of Dental Examiners
- Board of Chiropractic Examiners
- Board of Chiropody Examiners
- Board of Nurse Examiners
- Board of Barber Examiners
- Board of Cosmetics Examiners

ENGINEERING AND CONSTRUCTION REGULATION

- Board of Architecture Examination and Registration
- Board of Registration for Engineers and Land Surveyors
- Board of Examination of Plumbing and Heating Contractors
- Building Code Council
- Board of Boiler Rules

LEGAL PRACTICE REGULATION

- Board of Law Examiners

Also of recent origin are certain agencies which co-operate with Federal agencies in the interests of the consumer and are parts of the very comprehensive program of the National Administration. The State Board of Housing, created in 1933 and consisting of five members appointed by the Governor, supervises and regulates the approval of housing projects, fixes their rental and purchase prices, and studies housing conditions. In the same connection, the Housing Authorities Law, passed in 1935, provides for the remedy of unfavorable housing conditions in towns of over 15,000 population through the establishment of local housing authorities.

The Board of Rural Rehabilitation, created in 1935, is composed of three members appointed by the Governor, for the purpose of supervising rural community projects and rehabilitation corporations and of making such recommendations as are found necessary for the effectuation of a higher standard of living among rural communities.

The Rural Electrification Authority, also created in 1935, is composed of six members appointed by the Governor. Its duty is the securing of electrical services for the rural districts of the State where such service is not already rendered, and it is empowered, in the performance of this duty, to make investigations and surveys, to dis-

seminate information, and to supervise the Electric Membership Corporations (provided for in another law) organized for the purpose of providing the required electrical services.

A special temporary State Commission, also created in 1935, is entrusted with the duty of studying the question of Alcoholic Beverage Control. In the performance of this duty it is their purpose to investigate conditions in the State relative to the sale, manufacture, and use of alcohol for beverage purposes, to consider the control laws of other states, and to make its report at the next session of the General Assembly.

The county and city also perform certain services in the interest of the consumer. An official appointed by the Board of County Commissioners exists in some of the counties, who is entrusted with "the safe-keeping of weights and measures, stamps, and brands." In addition the Board may appoint inspectors for any particular article of commerce. The cities operate electrical departments, which inspect wiring and apparatus and issue permits for the installation thereof; and also building and plumbing departments, which inspect buildings, issue permits for their construction, repair, or demolition, and issue permits for the installation of plumbing.

HEALTH AND WELFARE

These vital services, so important in the life of the individual, are treated hereafter under a separate chapter.

SERVICES FOR LABOR

To the laborer in his relations with his employer, the State offers assistance of inestimable value. Improvements of working conditions, settlement of disputes, regulation of child labor, and assistance in the securing of employment are all services performed by the State agencies in the interest of the working-man. The State supplies a link between capital and labor, between the bargaining power of the employer and the more deficient bargaining power of the employee, achieving, to a certain extent, the unity of purpose necessary to harmony and to efficient production.

The chief agency providing services to labor is the State Department of Labor, headed by the Commissioner of Labor, an elective officer. Within the Department, there are eleven divisions, each with a specific task to perform: the maintenance of high standards of working conditions through regulation and inspection; the settlement of strikes and disorders; the inspection of mines and quarries; the welfare of employed children; the maintenance of safe working conditions; assistance to war veterans in prosecuting claims for disability compensation and for hospitalization; the welfare of the deaf; the collection of statistics on labor; the inspection of boilers; the employment service; and the settlement of workmen's compensation claims.

The Board of Boiler Rules, performing the service of boiler inspection, was created by the 1935 General Assembly, being composed of five members, appointive and *ex officio*. The State Employment Service, whose organization was amended in 1935 in the interests of greater service and co-operation with the Federal program of re-employment, is headed by the State Employment Director, who is appointed by the Commissioner of Labor.

The Industrial Commission, established in 1929 and made a division of the Department of Labor in 1931, administers the Workmen's Compensation Act, holding hearings and making awards, examining claims, compiling accident statistics, and making safety inspections. In the fiscal year 1935-36, 32,568 claims were adjusted by the Commission, the total compensation awarded amounting to \$901,009, and the medical costs approved, to \$455,953.

The Child Welfare Commission, an *ex officio* body, administers the laws relating to child labor and makes whatever inspections and collections of statistics that are necessary for the performance of its duties.

SAFEGUARDING OF BANKING FACILITIES

At the head of the State agency in regulation of banking stands the Commissioner of Banks, appointed by the Governor. This has been a separate administrative office since 1931, when the office became one distinct from the Corporation Commission. His duties are in connection with the supervision of banks, as well as of trust departments of commercial banks. An Advisory Commission composed of five members, appointive and *ex officio*, advise with the Commissioner on questions of the administration of banking laws.

Under the supervision of the Banking Commissioner there are 169 commercial State Banks with 86 branches, 29 industrial banks with 2 branches. State Building and Loan Associations, under the inspection of the Insurance Department, number 178, being located in 130 towns and cities and 71 counties. Federal Building and Loan Associations number 12, being located in 9 places in the State.

AID TO AGRICULTURE

To the farmers of North Carolina, who make up by far the preponderance of the people who are engaged in gainful occupations, the State, and to a smaller extent, its subdivisions, offers many and varied services. The importance of efficient production and distribution to the welfare of those engaged directly in agriculture, as well as to those engaged in related industries, and indeed to all the people of the State, is and has been recognized by the State.

In the furtherance of the benefits of education in agriculture, the Constitution provides for an elective Commissioner of Agriculture, in charge of the very comprehensive Department of Agriculture. Within this Department there are fifteen divisions, each of which provides a distinct service to the farmers, among these being the extermination of insects, inspection against animal and plant diseases, tests and analyses, financial loans, dissemination of information, co-operative marketing, and the maintenance of test farms. The Department operates entirely on its own receipts from an inspection tax, the expenditures in the fiscal year 1934-35 amounting to \$326,120.76, and receipts to \$416,385.19.

Further services are provided to agriculture by other State agencies. An advisory body, the Board of Agriculture, acts also as the Crop Pest Commission, providing information on crop pests and methods of extermination. The Joint Committee on Agri-

cultural Work promotes co-operation between the Department and North Carolina State College of Agriculture and Engineering. The Board of Farm Crop Seed Improvement, established in 1929, controls and supervises the production, distribution, and certification of pure-bred crop seeds. The Commission for the Investigation of Fertilizer Costs, created in 1935, is an appointive body consisting of eight members, charged with the duty of studying reasons for the great increase in the retail price of fertilizer, and of recommending the enactment of legislation for remedying this situation, making a final report to the next General Assembly.

County co-operation in the performance of services to agriculture consists of the work of Farm and Home Demonstrators, who are usually paid by both the county and the State College Extension Service.

CONSERVATION AND DEVELOPMENT

This department has as its chief aim the conservation, wise use and increased development of the natural resources of the State. Seven main divisions are set up as described below.

The Division of Commercial Fisheries regulates, advises and stimulates interest in the large and productive fishing industry along the coast and sounds of eastern North Carolina. It enforces regulations, sets up areas within which such fishing may be carried on, issues licenses and seeks to protect and develop the food fish and shell fish resources.

The Division of Forestry has supervision of State Parks, carries on Forest Fire Prevention work, operates forest nurseries, supervises the work of forest wardens, and co-operates with Federal, local and private efforts to conserve, use, and develop forest resources. The Division of Game and Inland Fisheries regulates hunting and fishing, operates fish and game hatcheries, maintains game and wild life reserves and sanctuaries, and interests itself in wild life conservation.

The Division of Mineral Resources collects and disseminates data on the location of the many valuable mineral deposits in the State, receives reports of mining operations, co-operates with and advises operating companies, and seeks to develop wider use and production of the abundant mineral wealth to be found throughout the State. The Division is under the direction of the State Geologist, who also renders frequent and valuable service in supplying geologic data for well location, public construction and other purposes.

The Division of Water Resources and Engineering, in co-operation with the U. S. Geological Survey, maintains nearly 100 stream gaging stations, and carries out extensive surveys for stream discharge, ground water resources, public water supplies. This Division also collects information relative to power development and distribution, carries on studies in Beach Erosion, Stream Pollution, Flood Control, and performs various engineering services for the Department.

The Division of Commerce and Industry co-operates with the other divisions, State departments and local interested parties in promoting the commercial and industrial development of the State, through publication of facts, advertising the State's advantages.

The publication of this volume is largely the work of the various divisions of the Department of Conservation and Development, and exemplifies the service it seeks to render.

THE ORDERING OF ELECTIONS

For the citizen as a voter, the State, together with the several counties, provides such regulation of elections as will insure fairness and equality of opportunity. The State election laws are administered by disinterested agents.

The State Board of Elections, consisting of five members appointed by the Governor, is the chief agency for the enforcement of the State and county election laws. In the performance of its duties, this Board prepares election forms, orders elections, tabulates returns, makes recounts, and appoints a board of elections in each county. These county boards administer in turn, the election laws for each of the counties. Reports of all elections in the State, with the exception of municipal votings, are filed at the office of the Secretary of State.

HIGHWAYS AND PUBLIC WORKS

The importance of good roads to the welfare of the citizens has been well recognized by North Carolina. The extensive road building program of the late twenties, on the part of the State and the counties, demonstrated this fact. More recently, when the necessity arose for a centralized control of highways, the State assumed responsibility for construction and maintenance of all highways in the State, and today continues these services satisfactorily. The highway fund, through which the work is accomplished, is self-sustaining, being sufficient to withstand a transfer of \$1,000,000 each year to the general fund.

The principal agency in charge of highways is the State Highway and Public Works Commission, reorganized in 1933, and consisting of seven members appointed by the Governor. Its duties consist of the maintenance and construction of all public roads and the custody of all prisoners. For the purpose of administrative efficiency, there are five divisions within the State, and each division is in turn divided into five districts. Total revenues for the fiscal year 1935-36 amounted to \$37,359,946.59, of which 50.3 per cent was received in gasoline taxes, and 33.4 per cent received in Federal allocations. Expenditures in the same year totalled \$35,876,576.88. As of July 1, 1935, the total highway mileage in the State was 58,212, representing a total investment of \$269,738,572.

In the Prison Division of the Highway and Public Works Commission, there were on July 1, 1934, 7,546 prisoners, the average number during the fiscal year ending on the same date being 7,650. Of these, 570 were at the Central Prison and 6,140 at camps, the remainder being at the two additional prison farms.

The Division of Highway Safety, a unit within the Department of Revenue, has among other duties the issuing of drivers' licenses and the responsibility of directing the work of the State Highway Patrol.

Among other State agencies in this field is the Transportation Advisory Commission, consisting of twelve members, with the duties of making complete surveys of freight rates to, from, and within the State, in order to ascertain if there is discrim-

ination, of determining the probable causes thereof and of recommending a remedy, and of ascertaining if the State can aid in the development of water transportation to and from North Carolina ports in co-operation with the Federal Government or otherwise.

The Commission to Investigate County Claims for moneys spent on State highways was created in 1935, and consists of nine members appointed by the Governor, with the duty of reporting on or before November 1, 1936, on the fair and reasonable amount of money that should be refunded to each county for expenditures on State highways, in order to place it on an equitable parity with each other county.

With relation to water transportation, the Board of Commissioners of Navigation and Pilotage, composed of five members appointed by the Governor, controls pilotage services and other matters relating to the navigation of the Cape Fear River.

The cities, in their performance of services related to highways, and public works, operate public work departments, which are charged with the construction and maintenance of streets, sidewalks, bridges, and viaducts, the cleaning and sprinkling of streets, and the construction and maintenance of a sewerage system. In addition, public utilities of various sorts are operated, including a water works system, and in some cases public markets, airports, gas systems, and abattoirs.

SERVICES TO DEPARTMENTS

In addition to the broad field of governmental services directly to the citizens of North Carolina, there is a sphere of rather indirect service to the individual, services by one governmental department to another, which in turn contribute to the general welfare. For example, the 1935 General Assembly created a Commission on Inter-State Co-operation, with certain purposes involving general contribution to the life of the State: to perfect the participation of the State in the Council of State Governments, for the purpose of establishing and maintaining governmental machinery to facilitate communication, negotiation, understanding and co-operation between North Carolina and the other states, regionally and nationally; to report on the first day of each regular legislative session and at other times as deemed proper. This Commission has fifteen members, appointed by the Senate, the House, and the Governor, serving without pay. Such an agency is typical of the many temporary ones which serve each unit of government. More importantly, there are permanent departments of government in each of the three spheres—State, county, city—which devote their energies to an indirect service to the citizen, through other departments.

SUBORDINATE EXECUTIVE ACTIVITY

The Attorney General is a constitutional State officer elected for four years. He is legal advisor to the Legislature and to the Governor, and represents the State in its legal interests of any sort. Further, he gives opinions on all questions of law submitted by any State official. Upon request, the Attorney General consults with and advises Solicitors. His counterpart is found in the county and city attorneys, who, appointed by the local governing bodies, advise and defend the unit's interests in all legal matters.

The Secretary of State is designated by the Constitution, elected for a four-year term. He serves on important coordinating boards. His functions include: custody of

all statutes and resolutions, rolls of registered voters, and other State and official records; enrollment for ratification of all laws passed by the General Assembly; distribution of statutes and Supreme Court reports; and issuance of grants on public lands, as well as issuance of certificates of incorporation and registration of trade-marks.

In point of record-keeping, county and city have similar officers in the Register of Deeds and the City Clerk. Each records the activity of its local governing body. The former is a constitutional officer, elected by the county; the latter, locally created and appointed. While the City Clerk has only general duties in addition to serving as recorder for the governing body, the Register of Deeds has additional specifically enumerated duties and powers, among which are these: to register all instruments in writing delivered to him for registration; to index and cross-index such registrations; to make tax lists; and to issue marriage licenses.

CONTROL OF PERSONNEL AND PROPERTY

Since 1931, a Department of Personnel has functioned for the State government, superseding the old Salary and Wage Commission. Under the direction of the Governor, an active Assistant Director is appointed to function for the Governor, as follows: to make, with the heads of departments, bureaus, and commissions of the State, investigation of needs for personal service; classify employees; fix, with approval of the Advisory Budget Commission, standards of salaries and wages; to adopt rules relative to holidays; and to classify applicants for jobs. The functions do not apply to the Supreme Court, nor to employees of the State Highway on an hourly basis, nor to school teachers. For all other categories, however, the Department must approve all payrolls before payment. It might be observed that the Department comprehends 12,703 State employees and an annual payroll of over \$12,000,000. More than half of the personnel and slightly less than half of the payroll are attributable to the Highway and Public Works Commission. Educational institutions and executive and administrative departments are the two groups next in importance.

In the difficult depression years, no policy of personnel reduction was embraced. Salary adjustments have been the rule. From the old level of State salaries maintained till January, 1933, three cuts reduced the scale to the low point of May, 1933. In July, 1933, a readjustment of the wage base aided the lower brackets considerably and raised the level a bit all along the line. For two years, remuneration remained at that level. At July, 1936, the State salary scale stood at about 80 per cent of the January, 1933, figure.

Control of property starts with the purchase. As a section of the Governor's Office, the Division of Purchase and Contract has functioned since 1931 under a Director appointed by the chief executive. The Advisory Budget Commission serves *ex officio* as the Board of Award for the Division. The functions of the Division are to provide for centralized purchasing and contracting of supplies, space, and services for the State departments, institutions, and public schools.

By its service in four major divisions—Printing, Public Schools, Institutions, Highway—results are readily apparent for the first four years' operation of the Division of Purchase and Contract: actual saving to the tax-payers of from a half to one million

dollars; keeping within the State a larger part of State business than ever before; as a result of research and study, much progress in eliminating "expensive specialties" and simplifying needs of the using agencies; acting as clearing house of information on State-used products.

As a sort of corollary to the service of the Division just described, the 1935 Legislature created a Commission on Gasoline and Petroleum Supply, five persons appointed by the Governor to make a study of the probable cost of petroleum terminal facilities, and the cost of such additional equipment as may be desirable and necessary for distribution of the State's supply of petroleum products; to inquire into the advantage or disadvantage of the State's undertaking such an enterprise; to inquire into the entire field of petroleum sales to the public at retail in North Carolina, and to ascertain whether the State is being discriminated against; and to make such reports to the Governor and to the next General Assembly as might be deemed proper.

A department of purchase is permitted by statute to both county and city, charged with the duty of purchasing all supplies, materials, and equipment required by the various official departments.

The State Board of Public Buildings and Grounds is an *ex officio* body composed of the Governor, Secretary of State, Treasurer, and Attorney General. Its function is to supervise the care and upkeep of the public buildings and grounds in the Capitol City. The Board appoints a superintendent who has charge of the work, done by about fifty employees. Somewhat related with reference to properties is the County Surveyor, a constitutional officer elected for two years and compensated by fee.

FISCAL POLICY

The budget, the audit, the treasury—about these three terms revolve the functioning of government's finances. Tax collection is the means to the ends with which these three policy-connotating terms deal. Brief considerations of governmental finance will be given in that order.

The Budget Bureau and the Advisory Budget Commission were created for the State by statute in 1929. The Commission consists of four members: the chairmen of the House Appropriations and the Senate Finance Committees, and two other persons appointed by the Governor. The Bureau is in the office of the Governor, as *ex officio* Director. An Assistant Director, responsible to the Governor, is actually in charge.

The duty of the Director is to transmit certain prepared items to each biennial session of the Legislature, the budget document and the budget message, the budget appropriation bill, the budget revenue bill, and a bill containing methods and machinery for collection of taxes and listing of property for taxation. The activity of the Bureau is in preparation of the Directors' discharge of that duty; preparing the legislative items, making field surveys and studies of governmental agencies, receiving and studying all departmental accounting reports each month, and authorizing of all allotments and transfers. A specialized duty of the Bureau is to keep in touch with farming operations of the State through reports of State-owned farms and to direct the operations of the State Fair. The Budget Director has the joint duty with the Auditor of determining what

accounts and accounting systems shall be kept by the State and its departments. Further relation to the Auditor's office is apparent in the Bureau's auditing of that department and in advising concerning payments into sinking funds. The ends and means of State government meet in the Budget Bureau; here is the final administrative judge of State operations, here is the final adviser on manners of maintaining, expanding, or adjusting.

At its adoption, the Constitution designated the office of Auditor, elective, for a four-year term. In superintending the fiscal affairs of the State and in keeping and stating all accounts in which the State is interested, the Auditor both lays the grounds of budget action and carries into effect certain phases of the budget adopted. For these purposes, the present organization embraces divisions of receipts, disbursements, general accounts, and field audits. A duty rather unto itself is the Auditor's direction of the Pension Bureau, administering a State-wide system.

Budgeting by local government units is becoming the rule. The increase of State control over local debt is largely the cause of the tendency, together with the lessons learned severally by the counties from their over-loading in disregard for the future. In certain cases, a Finance Committee has been formed from the Board of County Commissioners to concern itself with solely financial problems. City governing bodies have been forced by circumstance to attend their debts with increasing diligence. The supervisory powers of the Local Government Commission are encouraging to local budgeting.

Annual audits are required of local units by the statute enabling the performance of the duties of the Local Government Commission. Independent audits are necessary in the case of contemplated financial re-arrangements, and are in some cases maintained regularly. The offices of County and City Auditor are both provided by law, having in most actual cases duties extended to accounting, bookkeeping, and tax listing. The insufficient records of local government units and the inadequate running account of their present operation attest to the need of stricter supervision of their accounting systems and auditing services.

The Treasury is in charge of a constitutional officer elected for a four-year term. The Treasurer is *ex officio* member of the Council of State and further commissions related closely to the discharge of his duties. His functions concern the handling of State funds and the procurement of State credit.

The office of County Treasurer is constitutionally established, being elective for two years. In some counties, it has been permitted by statute that a bank or trust company act as financial agent under a two-year appointment by the Board of Commissioners. Chiefly, the Treasurer keeps accounts of moneys received, held, and applied for the credit of the county. Incidentally, he administers all the real and personal property held in trust for the county. In city government, the Treasurer is appointed by the governing body and discharges the implied duties of handling and accounting for municipal funds, received and expended. The office of Accountant, where existent, serves largely to allay the excess of Treasury duties.

REVENUE RECEIPTS

North Carolina's Department of Revenue has the distinction of being the only State collection agency in the Union that collects all tax revenue of its unit. Its duties are to assess and collect all State taxes and deposit them daily to the credit of the

State Treasurer. The Commissioner of Revenue heads the Department, being appointed by the Governor for a four-year term. In addition to the Revenue Department proper, there is supervised the Bureau of Motor Vehicles, which comprehends the Highway Patrol and the Division of Highway Safety, and a section in connection with the Oil Inspection Division. The Tax Commission, a special arm of the Department proper established in 1927, was abolished in 1933; but a skeleton of its organization remains, collecting comparative running data on local government taxation.

The State Board of Assessments and Equalization and Review is under the chairmanship of the Commissioner of Revenue, who is empowered to exercise full functions of the Board when it is not in session. These functions of the Board concern supervision of the taxing system of the State, including counties and municipalities, and expression of final authority on tax appeals.

Taxes are collected by the Sheriff in a majority of North Carolina counties. However, specific Tax Collectors are provided by statute and Tax Supervisors are stipulated in each revenue act, selection being made by the Board of Commissioners. A County Board of Equalization and Review is constituted by the Board of County Commissioners' membership. City taxes are collected by appointees of the governing bodies, which persons are assisted often by a department charged with preparing tax bills.

As a measure of the volume of Revenue Department business, it might be noted that for the fiscal year nearly \$56,000,000 was received from all sources. This amount was about equally attributable to the Revenue Division and the Motor Vehicle Division, the former serving the General Fund and the latter the Highway Fund. Revenue Division items include principally the sales tax, income tax, franchise tax, and license tax; inheritance, beer, and a small miscellany of taxes relatively minor in importance. Receipts from these sources go chiefly to public schools and to debt service, demanding practically all of General Fund credits which serve in addition executive, legislative, and judicial expense, social welfare, higher education, and pension. The sales tax, now netting more than ten million dollars annually, is serving to replace adequately the old property tax no longer levied by the State. It is interesting to note that annual per capita retail sales in North Carolina amount to more than \$125.00.

Motor Vehicle Division items include chiefly gasoline taxes and automobile licenses; inspection fees, bus franchises, and title fees constitute a small portion of the Division's total receipts. These revenues are credited, in gross amount, to the State Highway and Public Works Commission. Principal expenditures are there made for maintenance of the completely State-owned highway system; incidental expenditures for construction, for the expenses of the Motor Vehicle Division of the Revenue Department, and for an annual transfer of a million dollars to the General Fund.

While the constitutional limitation as to the maximum income tax rate is the only restraint upon the taxing power of the State, the taxing abilities of the counties and cities are completely dictated by State law. The preponderant source of local government income is the property tax, a general ad valorem tax. In the case of counties, only slightly supplementary sources are present in fees for special services, poll taxes,

license taxes, and court revenues. In the case of cities, sizeable collections often come from sale of public services, from licenses, and from street assessments, these supplemented by a small miscellany of other items, such as tolls, fines, and forfeitures.

Two propositions recently adopted as possible amendments to the Constitution concern important phases of local government taxation. The one calls for the allowance of limited property tax exemption for homes occupied by owners, \$1,000. The other calls for the classification of property for taxation, as opposed to the old general property base. The first would restrict the principal source of local government revenue. The second would particularize general property taxation.

The purposes of local taxation should be noted. Debt service is, by far, the largest consumer of local revenue, amounting easily to more than one-third. The State's assumption of public schools and highways has relieved cities of expense for the former and the counties of expense for the latter. Education still constitutes an important concern of the counties, in their debt service and capital outlays. Roadways still comprise an important item of city expense, in maintenance of streets and street lighting. Health and welfare are alike common to the budget of county and city. Public services are negligible in the county scheme, but increasingly important in the city picture. Protection of person and property through police and fire departments have long been expensive duties of municipal government. Operation of utilities—water, gas, electricity—has become common for cities, which services are often self-sustaining and sometimes contributory to the general fund of the unit.

Consideration of local government finances would be quite incomplete without commendatory mention of the Local Government Commission. This body was created in 1931, and consists of nine members: the State Auditor, Treasurer, and Commissioner of Revenue, *ex officio*, and six others appointed by the Governor to hold office on this Commission. The Commission's functions are chiefly: to approve and sell all financial issues of local units of government; to supervise the sinking fund investments and other securities of local units; and to consult and advise with local units generally. Through its efforts, the debt structure of counties and cities of the State has been improved considerably through wisely planned and effectuated refunding operations. The relationship is now existant for an increase of these benefits to local governmental financial policy.

MISCELLANY

Government-as-agent has recently become the more conscious of itself. In 1931, there was created a State Commission for the Improvement of Laws, together with a Constitutional Commission. The work of the latter resulted in the presentation to the electorate recently of four propositions for the amendment of the Constitution. The former considers proposals for betterment of the law, and makes such investigations as necessary, recommending to the General Assembly changes in the law deemed expedient, with drafts of proposed bills and reasons for them. A particular Commission of that general sort is the one on Estate Law, established by the 1935 Legislature, and since then proposing a greatly simplified system.

It has long been the custom of cities to plan for physical development, setting aside zones for business and residential buildings, and by so doing to promote the health,

safety, morals, and general welfare of the community. The idea of outlining finances for the coming year or years has likewise been a common practice by all units of government. There has emerged recently an extension of this idea of planning. The 1935 Legislature approved the State Planning Board as an advisory agency of the State, under the direction of the Governor. The Board is charged with the duty to collect and arrange data concerning various projects in North Carolina that in the opinion of the Board may constitute proper and useful projects for development within the scope of the various agencies of the State or agencies of the Federal government. Authority is given to make investigation and to correlate information in all such matters as may be referred to it by the Governor or the various agencies of the State. In order to carry out the purposes of the Board, the Governor may from time to time make provision for any necessary expenses thereof not provided by the Federal government, out of the Contingency Fund appropriated for the use of the Governor's Office. The Board may accept and disburse, under approval of the Director of the Budget, any contributions made available by any State or Federal agency, or private or public endowment. At this point, Planning Board activities have justified the immediate usefulness of the Board as a clearing house of information on North Carolina as a whole and on the services of the State, county, and city governments. The ultimate service of the Board may be conceived as that of an advising and coordinating body, composed of experts in research and students of State culture, looking to a greater future for North Carolina.

COST OF GOVERNMENT FUNDS

The government of North Carolina is paid for out of three separate funds: the General Fund, the Highway Fund, and the Agriculture Fund. The latter two are self-sustaining, the Highway Fund even making a transfer of \$1,000,000 each year to the General Fund.

The Agriculture Fund, which in 1935-36 received \$382,177 and expended \$345,901, gets the major portion of its revenues from a fertilizer tax and the remainder from a multitude of other taxes, sales of seeds, serum, etc., test farm operations, etc. The major portion of its expenditures goes to the operation of the Department of Agriculture, and the remainder to the operation of the State Fair and the North Carolina State College Experiment Station, and to seed improvement.

The Highway Fund, in 1935-36, received a total of \$38,359,946, and expended \$36,876,577. Of its receipts, Motor Vehicle Revenue, including receipts from the gasoline tax and registrations, and Federal Aid allocations make up practically the total. Its expenditures include the costs of maintenance and construction of highways, the aforementioned transfer to the General Fund, debt service, and miscellaneous items.

The remainder of the governmental cost is thus taken care of by the General Fund, which in 1935-36 had total receipts of \$31,439,588, and total expenditures of \$31,201,705. The receipts include those from inheritance, license, franchise, income, sales, and beer taxes, the transfer from the Highway Fund, and non-tax revenue (earnings, fees, dividends). The expenditures include the cost of maintaining the legislative, judicial, executive, and administrative branches of the State government, the State educational insti-

tutions, the charitable and correctional institutions, State aid and obligations (miscellaneous services, including vocational education, mothers' aid, etc.), pensions, public schools, and debt service.

TAXATION

The State is limited, by Article V of the Constitution, in its taxing power. The General Assembly *may* levy a capitation tax, the proceeds of which are to be applied to education and the support of the poor; but actually this tax is not levied by the State but is reserved for counties and cities. All taxes on moneys, credits, investments in bonds, stocks, joint-stock companies, or otherwise, and on real and personal property, had, until now, to be levied uniformly, with exceptions in regard to certain notes and mortgages. A constitutional amendment, passed on November 3, 1936, changes this provision so that taxation need be uniform only on each class of property taxed, thus enabling the General Assembly to classify property for the purposes of the ad valorem tax. Here again, the State is not directly concerned, since it does not itself levy a property tax, but the limitations do nevertheless concern the control of the General Assembly over the taxation power of the minor subdivisions of the State. The State may, and does, however, in accordance with the Constitution, levy taxes on trade, professions, franchises, and incomes.

The usual exemptions from taxation apply in North Carolina. The property specifically exempted includes that of the State or municipal corporations, while the Legislature *may* exempt "cemeteries and property held for educational, scientific, literary, charitable, or religious purposes; also wearing apparel, arms for muster, household and kitchen furniture, the mechanical and agricultural implements of mechanics and farmers; libraries and scientific instruments, or any other personal property, to a value not exceeding three hundred dollars." An amendment passed on November 3 adds to the list homes occupied by the owners thereof, up to \$1,000 valuation.

The greatest single tax, in point of income, is the gasoline tax, which in 1935-36 provided revenues totalling \$18,809,411. This tax, at the rate of 6c per gallon of gasoline sold or distributed within the State by producing or importing distributors, goes into the Highway Fund, to be spent on the construction and maintenance of State roads. All uses except in motors on the highways are exempt and the direct payer of the tax may thus claim refunds with respect to taxes paid on gasoline purchased for farm tractors, motor boats, and manufacturing processes.

Next in size is the sales tax, first adopted in 1933, and providing in 1935-36 total revenues of \$10,181,373, all of which go to the General Fund. It is a tax on the privilege of engaging in the business of wholesale or retail merchandising, and is based on the gross sales of tangible personal property, with certain exemptions; viz, gasoline, commercial fertilizer, farm, forest and mineral products when sold by the original producers, public school books, fresh liquid milk, and buttermilk. The rates are, for wholesale merchants, one-twentieth of one per cent of gross sales, with a minimum tax, for any six-months period, of \$12.50; and for retail merchants, three per cent of total gross sales. It is mandatory upon retail merchants to shift the tax to the consumers; and upon wholesale merchants to absorb the tax as an expense of operation.

TABLE XIV
GASOLINE TAX RATES AND REVENUES—1922-1936

Year	1936	1935	1934	1933	1932
Rate	6c	6c	6c	6c	6c
Revenue	\$19,182,868	17,673,571	16,482,000	14,769,602	13,903,646
Year	1931	1930	1929	1928	1927
Rate	5c-6c	5c	4c-5c	4c	4c
Revenue	14,024,303	12,533,454	12,006,384	9,787,011	8,796,682
Year	1926	1925	1924	1923	1922
Rate	4c	3c-4c	3c	1c-3c	1c
Revenue	7,786,473	6,082,378	4,604,768	3,086,981	808,085

The income tax provided, in 1935-36, total revenues of \$8,088,119, of which 19.5 per cent was collected from individuals, 25.8 per cent from domestic corporations, 48.5 from foreign corporations, and the remainder from miscellaneous sources. The individual income tax includes taxes on individual, estate, and trust incomes, and is at present levied at a rate graduated from three per cent to six per cent. A constitutional amendment passed November 3, 1936, raises the maximum rate to ten per cent, but does not make it mandatory. In the case of residents the tax is levied on the entire net income; while in the case of non-residents the measure is the net income derived from sources within the State. The actual present rates, to be applied to the gross income less deductions less personal exemptions, are as follows:

- 3 per cent of the first \$2,000.
- 4 per cent of the second \$2,000.
- 5 per cent of the third \$2,000.
- 6 per cent of the excess above \$6,000.
- 6 per cent of the income of residents from the stock of foreign corporations.

As an aid in the administration of the tax, informational returns are required from persons controlling State, local, or private moneys in regard to amounts of \$1,000 or more paid or payable during the year to any tax payer; and are also required from partnerships and associations as regards the total income, names and addresses of partners, amounts of distributive shares, etc.

The income of domestic corporations is taxed on the basis of the entire net income at a rate of 6 per cent, the net income figure being arrived at by a deduction, from gross income, of certain exemptions and deductions. The corporation may deduct, from the tax due, State income taxes paid on income in other states. The tax on foreign corporations, also at a rate of 6 per cent, is based on the net income allocable to the State on the basis of the physical property and manufacturing costs, physical property and gross sales, or gross receipts within the State, depending on the nature of the main business.

Franchise taxes are levied for the privilege of doing business within the State, and provide in some cases practical monopolies. They yielded, in 1935-36, total revenues of \$7,245,754, of which 19.5 per cent was received from railroads, 24.3 per cent from public utilities, 18.3 on insurance premiums, 15.8 from domestic corporations, 11.4 per cent from foreign corporations, and the remainder from miscellaneous sources.

The tax on railroads is based on the value of the total property, tangible and intangible, allocable to the State; and is levied at a rate of nine-tenths of one per cent. The tax on public utilities, including electric light power, street railway, gas, water, sewerage, etc., is based on gross intra-state income at rates of 4 per cent for water companies and 6 per cent for all others. The insurance premium tax is based on gross premium receipts and is levied at a rate of $2\frac{1}{2}$ per cent, with a retaliatory provision as regards foreign companies. The rate on premiums for liability under the Workmen's Compensation Act is 4 per cent.

The franchise taxes on domestic and foreign corporations are of two kinds: the regular franchise tax on the privilege of doing business in the State, and a registration or organization tax. The franchise tax on domestic corporations is based on the appraised value of the capital stock, surplus, and undivided profits, at a rate of \$1.75 per \$1,000; while the organization tax is based on the total authorized capital stock and is levied at a rate of 40 cents per \$1,000, with a minimum charge of \$40. The latter tax is assessed and collected by the Secretary of State. The franchise tax on foreign corporations is based on the amount of capital stock, surplus, and undivided profits allocated to the business within the State, and is levied at a rate of \$1.75 per \$1,000. The registration tax, assessed and collected by the Secretary of State, is based on the total authorized capital stock, and is levied at a rate of 40 cents per \$1,000, with a minimum charge of \$40 and a maximum charge of \$500.

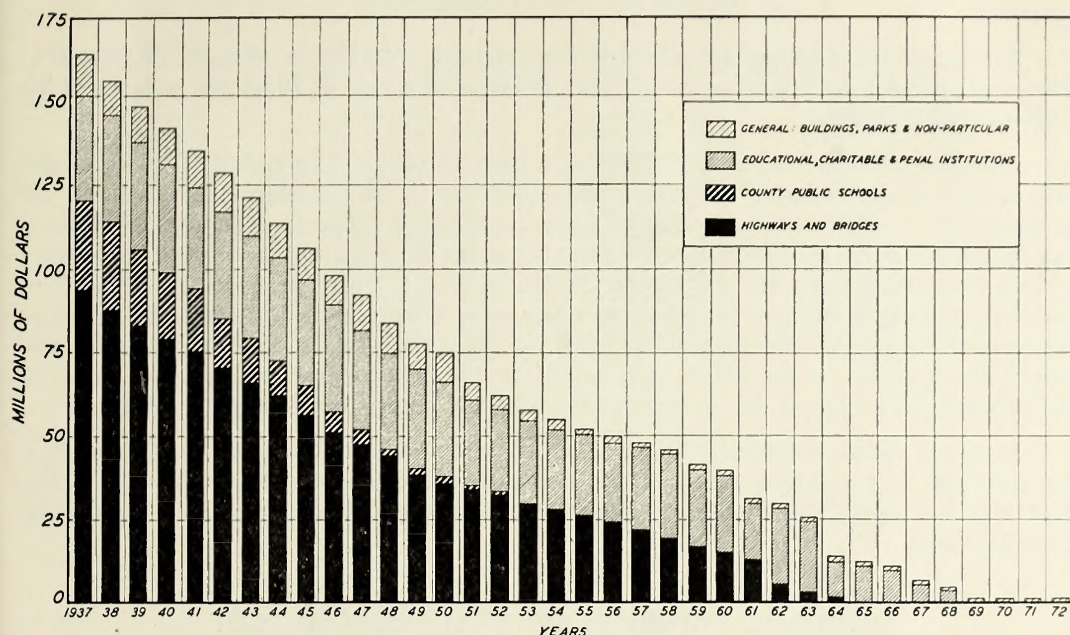
Other franchise taxes, of minor importance, include those on sleeping car, express, telegraph, telephone, and motor bus and truck companies.

Auto registrations yielded, in 1935-36, total revenues of \$6,914,609, all of which went into the Highway Fund. Licenses are issued for both passenger cars and trucks for the privilege of owning and operating within the State, each class being divided into three groups. The tax on private and for-hire passenger cars is based on the weight of the vehicle, being 40 cents per 100 pounds for the former, with a minimum of \$12.50, and \$1.90 per 100 pounds for the latter. The measure in the case of bus lines is gross earnings as well as weight, and is levied at a rate of 90 cents per 100 pounds plus the amount by which 6 per cent of the gross earnings exceeds this fee. In the case of trucks the tax on private and contract trucks is based on weight and capacity, being 60 to 70 cents per 100 pounds on the private, and 80 cents to \$1.30 per 100 pounds on the other. Franchise trucks are taxed on the basis of weight and gross earnings at a rate of 60 cents per 100 pounds, plus the amount by which 6 per cent of the gross earnings exceeds this fee.

License taxes, levied for the privilege of carrying on specified kinds of business occupations, produced total revenues to the State, in 1935-36, of \$2,323,866. These taxes are specified amounts, sometimes graduated according to the population for the municipality in which the business is done, the volume of business, and other criteria; and vary from

FIGURE 5

BONDED DEBT OUTSTANDING IN NORTH CAROLINA



\$5.00 up. They are levied not only by the State Commissioner of Revenue, but also by county and city authorities, and are collected by the Commissioner of Revenue and county sheriffs and local tax collectors.

About sixty-five types of business and professional activity are subject to State license taxes. The rates of the more important State license taxes are as follows: chain stores, \$50 to \$225 for each store in excess of one, according to the total number of stores in the chain; branch or chain automotive service stations, \$10 to \$85 for each store in excess of one, according to the total number in the chain; professions (law, medicine, accounting, engineering, real estate, etc.), \$35 per practitioner; automotive service stations \$5.00 to \$50, according to population; motor vehicle dealers, \$25 to \$200, according to population; tobacco and cigarette retailers and jobbers, \$5.00 to \$10, according to population; tobacco warehouses, \$50 to \$500, according to the volume of business; soda fountains, \$10 per arm plus 3 per cent of gross receipts; wholesalers and jobbers of bottled drinks not engaged in bottling, \$50 to \$100; bottling works, \$100 to \$600 per machine; moving picture theatres, \$25 to \$425, according to population, plus 3 per cent of gross receipts; distribution of moving picture films, \$625; hotels, 60 cents to \$8.50 per room, depending on rates charged plus 3 per cent of gross receipts of meals served; dealers in musical instruments, \$10; contractors and constructors, \$100 plus \$50 to \$1,250 on each project where the total contract price is in excess of \$10,000; installment paper dealers, \$100 plus one-fourth of one per cent of the face value of all obligations purchased or discounted; building and loan associations, 13 cents per \$100 of the

book of shares issued and outstanding; brokers and security dealers, \$25 to \$300 for each office and \$150 to \$1,000 for each ticker or leased wire, according to the population of the locality; and amusement parks, \$200 to \$800, according to the number of months operated.

The excise taxes on non-intoxicating beer yielded revenues, in 1935-36, of \$623,815. This tax, provided for by a statute of 1933, is levied at a rate of \$3.00 per gallon sold by wholesale distributors.

Inheritance taxes produced, in 1935-36, a total of \$530,617 in receipts. It is a single tax, levied on the transfer by will or intestate law or in contemplation of death, of property of a resident, or, in the case of a non-resident, of property over which the State has taxing jurisdiction. The measure of the tax is the clear market value of the property, and its rate varies from one per cent to twelve per cent, four per cent to twenty-four per cent, and eight per cent to twenty-five per cent, according to the class of the beneficiary and the size of the distributive interest. The estate tax is also a single payment one on the transfer of an estate. It is levied on the basis of the clear market value of the property at a rate of 80 per cent of the Federal Estate Tax under the 1926 rate.

Figure 5 shows graphically the amount of State Funded Indebtedness outstanding for each year of the future, classified according to the ultimate purpose for which the debt was incurred. This is based upon the outstanding indebtedness of the State as of June 30, 1936.

FIGURE 6

ANNUAL PAYMENTS ON STATE BONDED DEBT IN NORTH CAROLINA

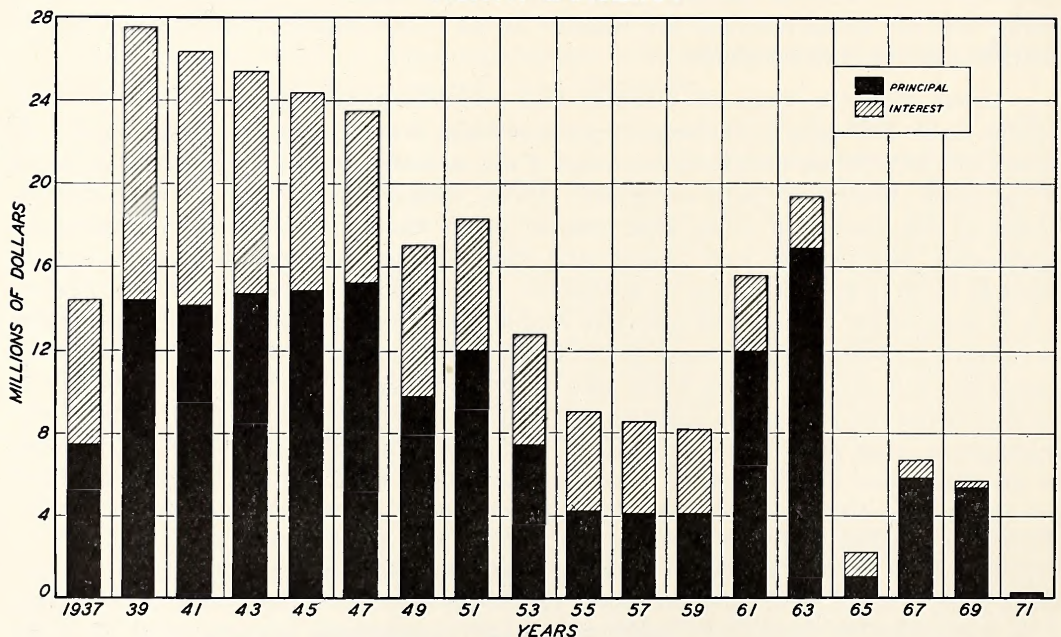


TABLE XV

GENERAL FUND RECEIPTS

Source	1935-36		1932-33		1928-29	
Inheritance Tax	\$ 530,617	1.7%	\$ 477,867	2.0%	\$ 922,172	4.4%
Licenses	2,323,866	7.4	1,819,527	10.5	1,448,704	8.8
Franchise	7,245,754	23.5	6,095,861	29.5	3,678,911	23.3
Railroads	1,448,155	4.6	1,438,610	7.3	467,433	3.0
Utilities	1,595,129	5.7	1,349,120	6.2	176,458	1.6
Ins. Premium	1,366,784	4.3	1,166,284	5.6	1,360,996	8.3
Dom. Corps.	1,187,486	3.7	740,740	3.7	606,391	3.7
For. Corps.	859,044	2.7	615,162	2.9	254,917	1.5
Others	789,156	2.5	785,945	3.8	812,716	5.2
Income Tax	8,088,119	25.6	5,549,011	34.4	7,656,259	52.7
Individual	1,558,291	5.0	959,686	4.1	2,467,908	15.7
Dom. Corps.	2,091,376	6.6	735,215	6.7	2,340,913	18.2
For. Corps.	3,931,409	12.4	3,849,279	20.4	2,847,102	18.8
Others	507,043	1.6	4,831	3.2	336	...
Sales	10,181,373	32.3	...	...	...	...
Beer	623,815	1.9	...	...	...	...
Miscellaneous	6,019	...	...	...	...	...
Public School	...	...	3,187,714	17.1	...	...
Refunds	25,000	...	...	...	2,500	...
Hwy. Fund Trans.	1,000,000	3.2	...	...	...	...
Total Tax Revenue	30,024,563	...	17,129,980	...	13,703,546	...
Non-Tax Revenue	1,415,025	4.4	1,222,373	6.9	1,672,437	10.8
Total	\$31,439,588	...	\$18,352,353	...	\$15,375,983	...

GENERAL FUND EXPENDITURES

Item	1935-36		1932-33		1928-29	
Legislative	\$ 13,965	0.4%	\$ 181,155	%	\$ 182,788	%
Judicial	367,029	1.1	341,583	1.4	392,967	2.6
Exec. & Admin.	1,550,507	5.0	1,120,266	5.0	1,950,399	11.8
Dept. of Rev.	332,443	1.1	136,486	0.6	169,793	1.0
Board of Health	282,301	0.9	225,275	1.0	422,362	2.8
Others	935,763	3.0	758,505	3.4	1,358,244	8.0
Educ. Insts.	1,784,488	5.7	1,497,340	6.2	2,858,585	17.8
U. N. C.	1,133,804	3.6	884,966	4.0	1,810,415	11.4
Others	650,684	2.1	612,374	2.2	1,048,170	6.4
Char. & Cor. Ins.	1,597,221	5.0	1,625,527	6.9	1,892,907	11.7
State Aid Oblig.	803,882	2.6	107,949	0.8	506,891	3.1
Voc. Education	131,954	0.4	98,789	0.5	179,099	1.1
Pur. Textbooks	565,481	1.8	...	...	...	...
Others	106,447	0.4	9,160	0.3	327,792	2.0
Pensions	580,170	1.8	784,691	3.2	1,340,310	9.4
Public School	20,223,211	64.7	16,840,561	63.0	3,255,839	21.8
Debt Service	4,281,233	13.7	4,201,131	13.5	3,188,591	21.8
Total	\$31,201,705	...	\$26,762,953	...	\$15,567,608	...

TABLE XVI

HIGHWAY FUND RECEIPTS

Source	1935-36		1932-33	1928-29
Motor Vehicle Rev.	\$25,872,283	67.6%	\$19,240,699	\$17,114,530
Registration	6,914,609	18.1	5,005,610	6,836,823
Gasoline Tax	18,809,411	49.1	14,165,026	10,122,649
Title Registration	158,986	0.4	70,063	155,058
Refunds	10,723			
Other Revenue	4,875		129,258	212,097
Federal Aid	12,482,788	32.4	5,470,693	1,716,916
Proceeds of Bonds				
Total Revenue	\$38,359,946		\$24,840,650	\$19,043,543

HIGHWAY FUND EXPENDITURES

Item	1935-36		1932-33	1928-29
Maint. State Hwys.	\$ 3,000,558	8.2%	\$ 2,026,476	\$ 3,986,587
Maint. & Cons. Co. Hwys.	6,078,597	16.5	4,846,243	
Improvements State & Co.	3,831,721	10.4		
Cons. State Hwys. S.F.	4,261,781	11.6	1,192,983	13,191,356
Cons. State Hwys. F.A.	5,465,963	14.8	3,504,524	
Trans. to General Fund	1,000,000	2.7		
Other Expenditures	3,603,272	9.8	609,620	1,558,420
Debt Service	9,634,658	26.0	8,931,468	8,477,498
Interest on Bonds	4,211,301	11.5	4,695,483	4,859,620
Sinking Fund Interest	500,000	1.3	500,000	500,000
Red. of Bonds	4,375,000	11.8	3,250,000	1,500,000
County Loan Rep.	548,357	1.4	485,985	1,617,878
Total Expenditures ..	\$36,876,577		\$21,111,314	\$27,213,861

TABLE XVII

AGRICULTURE FUND RECEIPTS

Source	1935-36		1932-33	1928-29
Fertilizer Tax	\$ 203,566	53.8%	\$ 176,297	\$ 261,007
Other Taxes, serum sale, Test Farm operations, etc.	178,611	46.2	129,013	234,240
Total Receipts	\$ 382,177		\$ 305,310	\$ 495,247

AGRICULTURE FUND EXPENDITURES

Item	1935-36		1932-33	1928-29
Dept. of Agriculture	\$ 315,001	91.1%	\$ 211,341	\$ 405,083
State College Exp. Sta. & Seed Improvement	30,900	8.9	42,480	62,000
Total Expenditures	\$ 345,901		\$ 253,821	\$ 467,083

The present highway indebtedness will be retired by 1965, while the next highest type, that for educational, charitable, and penal institutions, will be retired four years later, or by 1969. The debt for county schools will be repaid by 1953.

The second chart shows the amount required in each year for payment of interest and the retirement of the principal of the indebtedness.

COUNTY TAXATION

The greatest part of county receipts, for purposes of government, is in the form of property taxes. The Constitution, in Article V, provides that the total property tax, State and local, shall not exceed 15 cents per \$100 valuation of property, except when the county tax is levied for a special purpose and with the special approval of the General Assembly. Actually, the State levies no property tax at all, and the right to levy such a tax is thus reserved entirely to the county and to the county subdivisions (city, town, etc.).

The total property tax levy, county-wide, amounted in 1935 to \$19,379,586, at a rate of 88.7 cents, based on a total valuation of \$2,184,062,652. Of this total, 71.6 per cent was made up of real estate, 19.8 per cent of personal property, and the rest of public service property. By counties, the assessed valuation ranged from \$156,576,402 in Guilford County, to \$1,788,966 in Clay County; and the rates ranged from \$2.05 in Hyde County, to \$0.36 in Cleveland County.

Other county revenues in the form of taxes are receipts from poll taxes, licenses and permits, and miscellaneous taxes. The balance of revenues are certain non-tax receipts, including receipts from administrative departments, from service departments, grants from other governmental units, fines, gifts, income under the Alcoholic Beverage Control system, and capital receipts.

TABLE XVIII

COUNTY-WIDE PROPERTY TAX—1926-1936

Year	Assessed Valuation	Levy	Weighted Average Tax Rate
1926	\$2,794,931,069	\$34,424,630	123.2
1927	2,934,415,126	36,350,247	124.0
1928	2,963,302,911	37,127,659	125.0
1929	2,971,338,814	35,990,434	121.1
1930	2,974,464,650	34,800,054	117.0
1931	2,830,758,193	24,744,890	87.4
1932	2,726,373,672	22,817,350	83.7
1933	2,089,209,188	18,360,885	87.9
1934	2,152,443,146	18,685,954	86.8
1935	2,184,062,652	19,379,586	88.7

TABLE XIX

COUNTY-WIDE PROPERTY TAX BASE BY COUNTY—1935

County	Assessed	Rate Per \$100	County	Assessed	Rate Per \$100
Alamance	\$30,039,523	\$.95	Johnston	\$30,232,044	\$1.50
Alexander	7,246,373	1.30	Jones	3,965,763	1.35
Alleghany	3,998,305	.885	Lee	10,849,322	1.00
Anson	14,597,056	.88	Lenoir	17,510,554	1.65
Ashe	3,748,554	1.40	Lincoln	12,753,470	1.08
Avery	4,434,864	1.85	Macon	5,678,767	1.00
Beaufort	19,975,585	1.07	Madison	7,482,712	1.50
Bertie	9,610,375	1.45	Martin	10,890,231	1.43
Bladen	10,300,377	1.20	McDowell	16,558,472	1.20
Brunswick	6,464,595	1.50	Mecklenburg	134,431,410	.64
Buncombe	80,953,134	.77	Mitchell	6,332,386	1.78
Burke	20,661,158	.97	Montgomery	13,482,181	1.30
Cabarrus	38,625,212	.61	Moore	20,268,371	.73
Caldwell	20,126,331	.90	Nash	25,484,043	.85
Camden	3,067,595	.92	New Hanover	50,857,900	.65
Carteret	9,549,829	1.50	Northampton	9,881,560	1.00
Caswell	7,164,094	1.20	Onslow	6,864,980	1.49
Catawba	38,019,894	.90	Orange	13,903,824	.80
Chatham	15,273,380	1.10	Pamlico	3,392,463	1.75
Cherokee	7,358,918	.90	Pasquotank	12,202,470	1.40
Chowan	6,745,192	1.06	Pender	7,560,355	1.30
Clay	1,788,966	1.95	Perquimans	5,526,799	1.40
Cleveland	28,703,049	.36	Person	9,883,865	1.15
Columbus	18,519,328	1.20	Pitt	30,647,432	.83
Craven	13,164,100	1.60	Polk	5,206,156	1.60
Cumberland	19,900,831	1.79	Randolph	17,767,418	1.24
Currituck	4,447,249	.84	Richmond	21,852,759	.79
Dare	2,559,983	1.75	Robeson	31,213,163	.80
Davidson	32,336,932	.62	Rockingham	39,968,549	1.10
Davie	10,680,118	.75	Rowan	58,766,867	.53
Duplin	15,622,075	1.55	Rutherford	22,384,118	1.25
Durham	94,780,039	.50	Sampson	17,594,100	1.00
Edgecombe	23,915,261	.88	Scotland	11,436,156	.60
Forsyth	156,309,760	.50	Stanly	23,372,388	1.00
Franklin	11,219,477	1.00	Stokes	8,596,368	1.54
Gaston	75,577,014	.51	Surry	23,247,906	.85
Gates	5,076,246	1.00	Swain	5,974,185	1.25
Graham	6,783,887	1.20	Transylvania	4,687,838	1.55
Granville	16,633,993	1.08	Tyrrell	2,591,509	1.00
Greene	6,769,898	2.00	Union	15,014,553	1.35
Guilford	156,576,402	.68	Vance	16,525,638	1.03
Halifax	30,217,760	.80	Wake	76,741,093	.75
Harnett	18,228,552	1.25	Warren	9,067,745	.66
Haywood	22,824,633	1.31	Washington	5,673,761	1.80
Henderson	20,639,365	.90	Watauga	7,805,822	1.20
Hertford	7,535,756	1.00	Wayne	32,227,759	1.00
Hoke	7,319,081	.88	Wilkes	12,488,243	1.00
Hyde	3,549,134	2.05	Wilson	25,314,432	1.10
Iredell	31,574,713	1.35	Yadkin	7,909,930	.75
Jackson	8,115,755	1.41	Yancey	4,663,121	.95
Total			Total	\$2,184,062,652	\$.887

TABLE XX
PROPERTY ASSESSMENTS BY CLASSES OF PROPERTY—1932-1935

Class of Property	1932		1933		1934		1935	
	Amount	Per Cent Total	Amount	Per Cent Total	Amount	Per Cent Total	Amount	Per Cent Total
Real Estate:								
Land.....	\$ 899,830,252	33.0	\$ 666,624,821	31.9	\$ 689,460,562	32.0	\$ 686,726,519	31.5
Town Lots.....	1,046,766,736	38.4	770,055,004	36.9	773,070,378	35.9	778,661,617	35.7
Other.....	128,016,386	4.7	105,656,540	5.1	95,659,749	4.5	97,697,915	4.4
Total Real Estate...	\$ 2,074,613,374	76.1	\$ 1,542,336,465	73.9	\$ 1,558,190,689	72.4	\$ 1,563,086,051	71.6
Personal Property:								
Strictly Personal (taxable).....	\$ 160,117,497	5.3	\$ 131,511,202	6.3	\$ 127,712,950	5.9	\$ 135,025,585	6.2
Commercial and Manufacturing Items.....	245,546,791	7.9	188,792,989	11.0	231,894,218	10.8	260,209,245	11.9
Other.....	29,276,905	1.1	27,740,609	1.3	32,234,711	1.5	37,846,143	1.7
Total Personal Property.....	\$ 405,664,288	14.9	\$ 349,044,800	16.6	\$ 391,841,879	18.2	\$ 433,080,973	19.8
Public Service Property Assessed by State Board of Assessment.	\$ 246,096,010	9.0	\$ 197,827,923	9.5	\$ 202,410,578	9.4	\$ 187,895,628	8.6
Total.....	\$ 2,726,373,672	100.0	\$ 2,089,209,188	100.0	\$ 2,152,443,146	100.0	\$ 2,184,062,650	100.0

CHAPTER IV

EDUCATION IN NORTH CAROLINA

The last quarter century has been marked in North Carolina by an amazing growth and development of all phases of public education. The annual appropriation from State funds for schools has increased from \$100,000 in 1899, to nearly \$21,000,000 in the current year.

The total value of school buildings has risen from \$5,800,000, to \$106,600,000, while the number of teachers and principals employed increased from 11,200 to 23,700, with a very marked improvement in their general educational and pedagogical training. The number of high schools has increased from less than 250 to more than 900, with enrollment of nearly 160,000 persons, of whom more than 21,000 are graduated annually.

Perhaps the greatest achievement of recent years has been the establishment of a State-wide minimum school term of eight months, supported entirely by the State without resort to ad valorem taxes, and available to every child. North Carolina, with the possible exception of Delaware, is the only State in the Union to accept this responsibility of the state government as a state supported enterprise.

Along with this advance has come a development of transportation for rural school children, under which more than 275,000 children are transported daily, to and from the schools, with an almost perfect record of freedom from accident. According to recent estimates, this represents one-seventh of all pupil transportation service rendered throughout the entire United States.

Furthermore, under a sound budget plan, with careful administration, these great advances in public education have been carried out with the prompt payment of all current obligations for salaries and other operating expense. While the salary scale for teachers is low, compared with the national average, all salaries are paid in full and substantial increases have been made in the last biennium.

It is therefore very fitting that the splendid educational facilities available through the whole range of educational endeavor, to every child in the commonwealth, be considered as among the greatest resources of the State. In the following sections, more detailed account of the development and extent of the facilities available in various phases of education in North Carolina will be presented.

ELEMENTARY EDUCATION

Prior to 1837, efforts at education in the colony and early State had been made chiefly by lay readers in the churches, and missionaries, such as those sent by the Society for the Propagation of the Gospel in Foreign Parts. The apprentice system was in operation. The University of North Carolina was established in 1789, and numerous academies, the forerunner of our public schools, were established by private persons or small groups. Forty-two such schools were established prior to 1800, and in the succeeding twenty-five years about one hundred and thirty-five others were established, at least one in each county, except Ashe, Columbus, and Person.

In 1816, under the leadership of Archibald D. Murphey, reports were submitted to the Legislature, bearing on a plan for education. The Literary Fund was established in 1825, and finally the Legislature in January, 1839, enacted its first State-wide public school law. Under this law, with small budgets, administered by the Literary Board, subject to many difficulties, the school system slowly grew. In 1852 the first State School Superintendent was elected, and by the time of the beginning of the Civil War, North Carolina had progressed so far as properly to claim the distinction of being the leading State in the South as far as public education was concerned.

In 1869 under the new constitution, the school law then passed provided a prescribed school term, made provision for a school tax, and for the education of the negroes. The difficulties of Reconstruction and adverse judicial decisions greatly retarded education in the next two decades, although there were some signs of improvement. In 1877, two normal schools, one for white teachers, at Chapel Hill, and one for colored teachers, at Fayetteville, were established. Between 1875 and 1885 free public graded schools were established in Greensboro, Raleigh, Salisbury, Goldsboro, Durham, Charlotte, Wilmington, Fayetteville, and Winston-Salem.

The real growth of the public schools did not begin until the early days of the twentieth century. In the first fifteen years of the century the State enacted a compulsory attendance law, a child labor law, provided for public high schools, established the East Carolina Teachers College, farm-life schools, increased the school term from four to six months, provided for the State equalization fund, greatly strengthened the growing North Carolina College of Agriculture and Engineering, the State Normal and Industrial College at Greensboro, and greatly increased its support of the State University.

This remarkable growth and betterment of schools has continued to this day. Improvement in school buildings, in teacher certification, increased normal school facilities, better administration, consolidation of rural schools, bus transportation, increased appropriations, better sanitation, enlarged curricula—by all these criteria the advance in educational activities is shown to be great.

SECONDARY EDUCATION

The development of high schools in North Carolina dates almost entirely from 1907, when the Legislature authorized the establishment of rural high schools and appropriated \$45,000 per year for their maintenance. In the year 1899-1900, there were perhaps thirty public high schools in the State. These were almost entirely special charter schools, established and maintained by larger communities under special enactments. The enrollment was approximately 2,000, though there were probably an equal or somewhat greater number in private high schools and academies.

Following the act of 1907, and supported further by a Supreme Court decision in 1917 which recognized the high school as an integral part of the public school system, the number of high schools increased very rapidly. By 1915, there was a public high school in every county. This year marked also the beginning of the Rosenwald Fund building program for negro schools. The following table shows the high school standing for 1934-35:

TABLE XXI
HIGH SCHOOL STANDING FOR 1934-1935

	Rural	City	Total
Number of Schools	632	84	716
Accredited	596	84	680
Unaccredited	36		36
Number of Teachers	3,256	1,179	4,435
Male	1,598	339	1,937
Female	1,658	840	2,498
Enrollment	91,518	40,465	131,983
Male	42,319	19,429	61,748
Female	49,199	21,036	70,235
Average Daily Attendance	79,106	36,026	115,132
Per Cent in Attendance	86.4	89.0	87.2
Graduates	12,841	5,706	18,547
Male	5,190	2,483	7,673
Female	7,651	3,223	10,874

PROGRESS IN SCHOOL BUILDINGS

The development of school buildings in North Carolina follows the same general trend as outlined in the discussion of the development of elementary and secondary education. The first public school law directed the formation of school districts and required buildings for fifty pupils to be located on five-acre sites, the whole cost not to exceed \$125.00.

From this most humble beginning, progress was exceedingly slow for many years. In 1880, there were 3,766 school houses, with an average value of \$47.67. By 1901, the number had grown to 7,111, valued at \$1,153,986.00.

Beginning in 1921, the Legislature made available nearly \$18,000,000, borrowed by ninety-nine counties, and 1,081 projects were constructed. With this aid, and under the competent supervision of the Division of School House Planning, during the period of 1921 to 1927 more than \$65,000,000 was expended on school buildings, nearly half of which was spent on rural school buildings. This great expansion in physical plant was done in accordance with a sound policy of planning schools on a county-wide basis, of consolidation of small units and transportation of pupils, the buildings being constructed in accordance with well considered plans, of permanent materials.

With the onset of the depression, expenditures for school buildings practically ceased. The various Federal Relief and Public Works agencies contributed greatly to the solution of the school building problem, contributing more than \$12,000,000 towards the construction, maintenance, and repair and general improvement of school properties.

As a consequence of these various movements, one may find scattered all over the State in North Carolina modern school buildings, of good design, well maintained, where will be found enrolled more than eighty percent of the total school population, with an average daily attendance of nearly 85%. Reference to the general statistical table will

show how rapidly the number and value of these properties has increased. While there remains much yet to do, nevertheless North Carolina may justly be proud of the record of the last quarter-century in developing school plants, building and equipment, and in the beautification of grounds. With good roads, transportation at public cost, eight months schools, modern school plants available to every child in the State, public education may be said to be well established in North Carolina.

SCHOOL TRANSPORTATION

The history of public education in North Carolina for the past 20 years includes the development of one of the largest, if not the largest, school transportation systems in the world; and it is likely that the reports for 1934-35 will remove any question as to this State's first place in the number of children transported. Growing from six vehicles carrying 247 children in 1915, to a fleet of 4,000 modern school buses carrying approximately 300,000 children to and from school daily for a term of 160 days in 1935, school transportation has become one of the most important functions in the operation of the public schools in North Carolina. From the accompanying table of statistical information one may get a very accurate account of the progress of the transportation of pupils at public expense. The growth has been rapid at times, with greater advancement being made within the period of 1925 to 1935.

TRANSPORTATION AND CONSOLIDATION

The transportation of pupils at public expense became a necessity when the educational leadership decided that the small type school should be consolidated into larger units. Not unlike other changes, the progress of consolidation and transportation met with opposition. It would be difficult to determine that the objection to pupil transportation caused the opposition to consolidation, but to say the least there were many who fought school consolidation by reciting the hazards and inconveniences to their children in being transported to the larger schools. Naturally the opposition made the early progress rather slow, as will be noted by referring to the table giving the advancements from 1915 to 1930.

Today there is a wide-spread demand on the part of all small school centers for transportation to larger centers. This is true for the remaining small schools for the white race, and particularly true for the colored race, for the consolidation of the small schools.

PUPILS TO BE TRANSPORTED

In the beginning of school transportation, it was not necessary to designate by legislative enactment, or otherwise, those to be transported. As the State assumed greater responsibility for the support of public education, it became necessary for the same agency to exercise some control over the pupils to be transported. In 1933, when the State assumed the responsibility for the operation of a uniform eight months school term throughout the State, legislation was enacted providing for the transportation of all children who lived more than two miles from the school to which they were assigned. It further provided that a school bus should be operated within one and a half miles of

all children who lived more than two miles from the school, unless road or other conditions made it impractical to do so. In 1935, the General Assembly provided for the operation of the school bus within one mile of all children living more than one and a half miles from the school to which they are assigned, unless conditions make it inadvisable to do so. In so far as has been determined, this is the most generous average transportation service provided by any state in the Union.

CONTROL AND MANAGEMENT OF TRANSPORTATION

Along with the other operations in public education, the responsibility and control of school transportation have gradually changed from local district to county, and recently to State. The School Machinery Act of 1935 places with the State School Commission the authority and the responsibility for the operation of the transportation of pupils. The State agency delegates, in so far as possible, this authority to the local superintendent and other associates. There are certain items in the operation which can more properly be handled by State authority. The present law makes the matter of selecting drivers a responsibility of the local school people. In determining the routes to be followed by the 4,000 school buses, it has been necessary for the State agency to assume complete responsibility for this, with the indirect aid of local school officials. The School Machinery Act of 1935 placed the routing of buses in the hands of the State School Commission. It has resulted in marked decrease in the operating mileage, with an improvement in the average service provided. The very excellent highway maps available under a State-maintained system make the routing of buses possible.

PURCHASE AND MAINTENANCE

Through a State Department of Purchase and Contract, the State School Commission purchases all transportation equipment, including chassis and bodies. The purchase of repair parts necessary for the maintenance of the equipment is made by local officials who are charged with the responsibility, under the supervision and direction of the State, of maintaining the equipment while in operation. The responsibility for providing funds for the purchase of replacement buses rests with the State. The need arising because of the transportation of children, not transported in 1934-35, and to relieve the over-crowded present, must be met by the tax levying authorities within the county administrative units. The State has the responsibility for purchasing all supplies and providing all mechanical service necessary for the operation of the transportation system. It becomes the duty of the State to provide for the operation of all buses, including the additional ones purchased by the counties.

Within each county, maintenance facilities, including garage and mechanics, are provided by the State. Each school bus must be inspected at least every 30 days and a written report of its condition filed with the county superintendent of the schools. In most instances the equipment is inspected more often, and under a new arrangement for the distribution of motor fuels, a large portion of the equipment is carefully inspected every other day. The program of improving the transportation facilities through the replacement of the old and expensive units by new ones, and a better maintenance of the

equipment in operation, insures better transportation at less cost. Of the total expenditures for transportation in 1934-35 of \$1,883,744, there was spent for replacements a total of \$688,386, which provided approximately 800 new buses. As a result of this replacement program, operating costs were greatly reduced.

Coming from locally controlled organization with no uniformity in the type of equipment used in 1931, it has been possible through the State unit system to provide a more uniform type of equipment, meeting detailed specifications that will insure greatest safety at the lowest cost. The transportation equipment in the State at this time is in far better condition than it has ever been. More than 2,500 of the 4,000 units are equipped with standard bus bodies that have proved entirely satisfactory in all of the tests that have been given them through at least three years' service. North Carolina has been able to provide its equipment at an exceedingly low cost, and at the same time has the assurance that it is safe and comfortable.

A State-controlled transportation system, with approximately 3,500 of the 4,000 units being driven by high school students, with a record of having transported an average of 265,000 children in a fleet of 4,000 buses, with a daily operating mileage of more than 125,000 miles, for a term of 160 days without a fatal accident, is one of the noteworthy features of public education in North Carolina.

TABLE XXII

PUBLIC TRANSPORTATION OF PUPILS IN NORTH CAROLINA

Year	Number of Schools Served	Number of Vehicles	Daily Operating Mileage	Number of Children Transported	Current Operating Costs*	Current Cost Per Pupil	Capital Outlay Costs
1919-1920		150		7,936			
1924-1925		1,909	40,667	69,295	\$ 994,611	\$ 14.35	\$ 647,512
1929-1930	1,266	4,046	108,001	181,494	2,273,287	12.53	349,063
1934-1935	1,220	4,035	124,980	265,110	**1,883,744	7.00	68,000

* The current operating costs include all expenditures for purchase of replacement buses.

** Of the total of \$1,883,744 costs in 1934-35, \$688,386 was for purchasing replacement buses, with the Federal Government providing \$197,000 in a grant on a PWA project.

LOCAL SUPPLEMENTS

The descriptions given above of the provisions that have been made for elementary and secondary education have reference chiefly to the provisions which have been made by the State in guaranteeing a minimum of eight-months schooling. In addition to the State funds, twenty-eight cities or combined city and county units have, as provided under the law, supplemented the school budget from funds derived from local sources. In most instances these funds are derived from general tax levies on property, although in one instance they are contributed from private sources.

These supplemental funds are used to defray the expenses of an additional month of school, to pay higher salaries, to extend the curricula to additional subjects, or to pay for additional service of various kinds.

In addition to these supplemental funds, expended in operation and maintenance, the local units bear all expense for capital outlay and for debt service, payment of principal and interest on outstanding indebtedness.

NEGRO EDUCATION

The State has made notable progress in providing for the education of its negro citizens. Much of this progress has taken place in the last twenty years, since in 1915 there were no accredited high schools for negroes, either publicly or privately supported, no standard colleges, very few teachers who had a college education, school terms in rural areas were still only four months, and all buildings and equipment for negroes publicly owned would not exceed one million dollars.

Since 1921, the State normal schools and colleges for negroes have been reorganized, their physical plants enlarged, improving scholastic standards, eliminating elementary and secondary departments, introducing a full summer term and widespread development of extension courses.

The number of teachers has increased from 4,196, with an average training far less than high school graduation, to 6,600, averaging two and one-half years of college education. The number of accredited high schools in 1920 was eleven, with approximately 1,500 enrolled pupils. In 1934-35, the number had increased to 120, with 25,000 pupils enrolled.

In 1920, the five State institutions for higher education for negroes enrolled less than 100 of college grade. In 1934-35, these same five institutions passed the 2,000 mark in college enrollments. Similar development has taken place in the eight private schools, the total college enrollment in public and private colleges being nearly 4,000.

VOCATIONAL EDUCATION

Vocational education became an integral part of the public school system with the passage by Congress of the Smith-Hughes Act in February, 1917. In agricultural education, the work is carried out as a planned program of supervised farm practice, extending into the years following high school graduation, carried along with courses in agricultural education. Evening classes in agriculture are conducted for adults, and the Extension Service conducted from N. C. State College reaches all classes of farmers and every phase of rural life. Approximately 10,000 farmers are being given definite technical assistance through these classes. Similar courses in school are provided in Home Economics for girls, as well as extension courses for adult women.

Trade and industrial programs are carried out widely in the industrial centers, largely through night classes. From an initial enrollment of 551 students in 1918, the

movement has grown until in 1934-35, 37,355 students received definite vocational instruction, and \$534,506.00 was expended on the program.

OTHER EDUCATIONAL ADVANCES

Limitations of space will not permit adequate attention in this volume to many other advances and developments in the educational activities of the State. Curricula of elementary, secondary, and higher schools have been greatly enlarged and extended into new fields, in response to the growing demands of changing civilization. The facilities of teacher training in the State institutions, colleges and high schools, have greatly improved, and standards of teacher certification have steadily risen. Textbooks are greatly improved and specially adapted to teaching requirements and better pedagogical methods. A system of State adoption has worked for better quality and improved standards and economy. The library facilities have greatly expanded. From 1904 to 1934 the expenditures for libraries increased eleven-fold, and in the last ten years the number of volumes has tripled. In the last six years, the number of librarians with library training has increased from 24 to 282, and the books have been much more wisely adapted to the best use of the library. Extension courses conducted by the colleges and universities are widely patronized.

Another significant enterprise which the State has undertaken for education is the establishment of a State-wide textbook rental system. Many local districts have enjoyed the benefits of this provision, but in 1935 the General Assembly authorized, upon recommendation of the Governor, the issuance of bonds in the amount of \$1,500,000, to establish this as a State-wide system. It has long been recognized that the failure of pupils to purchase their textbooks promptly and in many instances their inability to purchase them, has greatly lowered the efficiency of the schools.

By careful management and a gradual extension of the service, and the use of surplus funds for temporary financing, nearly \$1,000,000 worth of books have been purchased and paid for and made available to the school children. The system has been installed in 129 administrative units, and these, together with the 22 local systems already in operation, serve all but twenty districts or units in the State.

Under the provision of the act, children may now rent books at one-third of the regular price and indigent children are furnished books free.

The many advantages of this system are apparent and the venture of the State into this field is another index to the progressive attitude of the State administration towards education. That this advance has been made possible without the issuance of any of the bonds as authorized, is another most noteworthy achievement in administrative finance.

As North Carolina approaches the Centennial Celebration of the Inauguration of Public Schools, it can do so with pardonable pride. The labors of the educational leaders of the past are truly beginning to bear fruit. While much remains to be done, the aroused interest of the citizens of the State in the cause of education, and a deeper realization of its necessity as a requisite to progress, insures a steady progress in the future.

TABLE XXIII
EDUCATIONAL PROGRESS, 1913-14 TO 1935-36

Items	1913-14	1923-24	1933-34	1934-35
Total school expenditure	\$ 5,059,351.00	\$ 29,747,075.84	\$ 19,238,772.81	\$ 21,106,559.47
Expenditure current expense	4,157,295.17	19,078,656.87	18,296,363.78	18,969,998.14
Expenditure capital outlay	902,055.83	10,688,418.97	942,409.03	2,136,561.33
Value of school property	9,078,703.27	59,758,005.00	107,080,903.00	106,599,972.00
Average value each schoolhouse	1,162.74	8,222.03	22,152.00	22,311.00
Number of log houses	165	53	4	
Number white 1-teacher schools	3,368	1,633	533	
Number teachers and principals	13,255	21,502	23,345	24,712
(A) White	10,082	16,382	16,814	17,038
(B) Colored	3,173	5,120	6,531	7,674
Average monthly salary paid	39.81	99.93	72.36	
(A) White teachers	43.69	110.06	80.27	
(B) Colored teachers	26.75	64.83	52.02	
Average term in days	122.0	143.4	159.3	159.9
(A) White schools	124.0	146.2	160.2	160.3
(B) Colored schools	114.8	134.6	157.3	159.0
Total school population	778,283	921,315	1,090,287	1,099,798
(A) White	525,107	628,132	749,392	759,308
(B) Colored	253,276	293,183	340,895	340,490
Total school enrollment	599,647	793,046	895,525	*892,648
Total average daily attendance	408,464	571,359	756,768	761,433
Per cent population enrolled	77.2	86.1	82.1	81.2
Per cent enrollment in average daily attendance	68.2	72.0	84.5	85.3
Per cent illiteracy	(a) 18.5	(b) 13.1	(c) 10.0	
(A) White	(a) 12.3	(b) 8.2	(c) 5.7	
(B) Colored	(a) 31.9	(b) 24.5	(c) 20.6	

(a) 1910 census.

(c) 1930 census.

(b) 1920 census.

*All duplicates excluded.

INSTITUTIONS OF HIGHER LEARNING

While the attention of the State has been largely directed to the development of the elementary and secondary phases of education during the last two or three decades and the growth and improvement in these has attracted much and nation-wide interest, the State has always been well supplied with facilities for advanced study in higher learning and the professions.

The first of these institutions was the University of North Carolina, established in obedience to the principles set forth in the first State constitution. Chartered in 1789, the first building was begun in 1793 and the first students were received in 1795. The

University thus became the first State University to open its doors. This institution now represents an investment of more than \$10,000,000. In the century and a half since its inception, this great University has touched the lives of thousands upon thousands of young men and women, has more than 18,000 living alumni, and now has a student body of over 3,000 students. There is here to be found a truly distinguished university, pre-eminent in the South and recognized everywhere for the high quality of its scholarship. Here, in addition to the basic College of Arts and Sciences, will be found the Schools of Commerce, Public Welfare, Library, Law, Pharmacy and Medicine, the Divisions of Education, Public Health Administration and University Extension. Here will be concentrated the graduate work under the supervision of the Graduate School, reaching into the humanities, the natural and exact sciences and the social sciences. Co-educational opportunities are provided in the upper college and the professional and graduate schools.

✓ The North Carolina State College of Agriculture and Engineering is a Land-Grant College, supported jointly by funds appropriated by both the State and National governments. This institution was authorized by the Legislature of 1887, and with one building erected, opened its doors in October, 1889. Since that day, it has grown rapidly in plant, equipment and numbers. The present plant is valued at nearly \$6,000,000. There are now 11,000 living alumni and a student body of 2,000 students.

This institution was formed in response to the needs of the State for training in Agriculture and the Mechanic Arts, and has served well in meeting these needs.

The college is comprised of the Schools of Agriculture and Forestry, Engineering, Textiles, and Science and Business. The last named School is being discontinued as a school of commerce and business administration. In addition to the Departments of Education, Graduate Instruction and College Extension, here is located also the Agricultural Experiment Station, the Agricultural Extension Service, and one division of the Summer School. From this institution the Farm Demonstration and Home Demonstration work for both white and colored farmers is directed. One important part of the School of Engineering is the Engineering Experiment Station, and the Textile Research bears the same relation to the Textile School. Here has been consolidated the agricultural, engineering, industrial, and other technological schools of the State. Here is found the capacity and facilities for training young men to assist in restoring and advancing the dignity and greatness of agriculture, for the intelligent development and operation of the many industries, and to provide scientific, technological, social-scientific and cultural resources for a wider and wiser social usefulness to a people in a region built largely on farms and factories.

✓ The North Carolina College for Women was established in 1891 under the name of The Normal and Industrial School, designed especially for the instruction and training of teachers. As opportunities and needs for the wider education of women have increased, the College has steadily increased in scope and developed until it stands today recognized as one of the leading institutions for the education of young women. It has a physical property valued at over \$7,000,000, a student body of 1,800, and more

than 14,000 living alumni. A distinctly Woman's Liberal Arts College, with a complete curriculum, three new departments have been recently added: a Department of Classical Civilization, with newly added courses in Greek; a Department of Art, and a Department of Philosophy.

THE GREATER UNIVERSITY

As in many other American states, these three institutions were founded separately, each in response to definite needs of the Commonwealth, and grew to maturity independently. Based on a recognition of their different functional values, the large capital investments in separate localities, the need came to be widely recognized for clearer differentiation and coordination of these functions, a better use of the separate investments, and a consolidation of values in one greater University.

The Legislature of 1931 passed an act consolidating and merging the three institutions into the "University of North Carolina." Recognizing on one hand the unwisdom of no consolidation, with consequent diffusion of effort in graduate schools and duplication in many departments, and on the other the impossibility of complete physical consolidation with its attendant additional costs of new construction, and losses of investment, traditions, loyalty and alumni interest, there has been achieved a notable preservation of the integrity, purpose and value of all three institutions.

There is thus provided two years of fundamental and cultural courses throughout the three institutions, with an elimination of duplication in either schools or curricula on the upper and graduate levels. The basic courses are not uniform, but vary according to the functions of the particular college. Here is presented, on sound working principles, what is undoubtedly bound to become, if indeed it has not done so already, a great consolidation of educational facilities unequalled in the South.

With the consolidated graduate resources of all three institutions, the co-operative effort of the Experiment Stations at Raleigh, the Institute for Research in the Social Sciences at Chapel Hill, the University Press, the Agricultural Extension Division at State College, and the College Extension Divisions of each college, there is provided means for learning the needs, developing, using and conserving the resources and enriching the life of all the people of the State and region.

With the development of further co-operation with other great schools and colleges, other than the State institutions, there is now possible the development in North Carolina of one of the greatest intellectual and spiritual centers of the nation.

In the short time that has elapsed since the passage of the act, much progress has been made. There is now provided one Board of Trustees and one Executive Committee of twelve members, the Governor being *ex officio* chairman of the Board and the Committee. The executive administration is conducted through one President, with three Deans of Administration, one for each college. The business administration is under the central direction of one controller. Each institution has its own Faculty Council, and representatives of each form of common administrative council.

The Library School at the Woman's College and the School of Science and Business at State College have been discontinued, this work being concentrated at Chapel Hill.

Co-educational opportunities are provided at Chapel Hill and at State College in the upper college, professional and graduate levels only. The administration of summer schools, graduate schools, and education extension has been consolidated and organized on a basis of central direction. No new registrations are now made at the Engineering School at Chapel Hill, this work to be transferred as rapidly as possible to State College at Raleigh.

As was to be expected, the cost to the State per resident student has been materially reduced. In 1928-29 the average cost from State appropriations per student was \$316.67. In 1936-37 this will be on the basis of present registration reduced to \$200.86. A part of this reduction was due, however, to salary reductions. Even if the salaries were fully restored, there would still be a saving of \$73.27 per student.

The progress in consolidation has attracted most favorable comment from many prominent college and university presidents, notably A. Laurence Lowell, President Emeritus of Harvard University, Presidents James R. Angell, of Yale University; Nicholas Murray Butler, of Columbia; Robert M. Hutchins, of the University of Chicago; Frank L. McVey, of Kentucky; L. D. Coffman, of Minnesota; and William E. Wickenden, of Case School of Applied Science.

OTHER STATE EDUCATIONAL INSTITUTIONS

The State has also established and maintains three standard four-year colleges for the higher education of white students, and two such colleges for the education of negroes. The first of these, now known as Western Carolina Teachers College, located at Cullowhee, was first established as the Cullowhee High School in 1889. A Normal Department was installed at State expense in 1893 and in 1905 further enlarged and called the Cullowhee Normal and Industrial Institute. At the present time this school has a faculty of 35, an enrollment of over 500 students, and a plant valued at nearly \$1,000,000.

The Appalachian State Teachers College at Boone, N. C., was established in 1903 as the Appalachian Training School. It now has an enrollment of over 900 and a faculty of thirty-five persons. The school now has a standard four-year college course, and for a third of a century has rendered most valuable service in general education and particularly in the training of teachers.

The most recently established of the three colleges is the East Carolina Teachers College, located at Greenville, N. C. This institution, which now has a plant valued at over \$3,000,000, a student enrollment of 1,034 and a faculty of over 50, was authorized by the Legislature in 1907 and opened its doors for students on October 5, 1909. This college is a qualified member of the Southern Association of Schools and Colleges.

The Agricultural and Technical College (Colored) at Greensboro and the North Carolina College for Negroes at Durham are both standard four-year colleges, established and supported by the State. The first has a plant valued at \$1,105,000, enrolls 565 students and has a faculty of 33. It has long rendered most valuable service to the

State in the higher education of negroes in agricultural and industrial subjects. The college at Durham has a plant valued at \$700,000, enrolls 280 students and has a faculty of 22.

The State also maintains the Winston-Salem Teachers College, the Elizabeth City State Normal School and the Fayetteville State Normal School, for the normal training of negroes. One of these, the Winston-Salem Teachers College, has recently become of standard grade, the others still being of Junior College grade.

The State also maintains the North Carolina School for the Deaf at Morganton, the State School for the Blind and Deaf at Raleigh, with separate divisions, plants and locations for white and colored students.

Limitations of space prevent adequate mention of the educational institutions conducted under private or denominational auspices. Many of these have long and distinguished records of service to the State, and in the aggregate far outnumber the State institutions in number of students and value of plant and equipment.

Notable among these is Duke University at Durham, the largest institution of higher learning in the State. Privately endowed, with one of the most extensive and beautiful campuses in the nation, this institution offers advanced instruction in Law, Medicine, Theology, and Engineering, in addition to regular undergraduate courses. Separate residence campuses are maintained for men and women, in the number of 3,350, with a faculty of 344 distinguished scholars. There is thus provided a most outstanding educational resource, of which the State is justly proud.

Wake Forest College, with 995 students, Davidson College, with 674 students, are outstanding examples of denominational colleges for men. Founded in 1834 and 1837 respectively, with high standards of scholarship, they have each made significant contributions to the life of the State, many of the greatest leaders in its development having come from among their graduates and former students.

Among the private colleges for women, Meredith College at Raleigh is the leading college in size and value of plant. Established as the Baptist Female University in 1891, this institution moved to a new campus site on the outskirts of the city of Raleigh and erected a modern fully equipped plant. With 505 students, a faculty of 46 members, and a plant valued at nearly \$2,000,000, this institution provides a high grade college training for young women.

Salem College at Winston-Salem and Queens-Chicora College at Charlotte are both excellent colleges for women, with enrollments of well over 300 students and plants and endowment valued at over \$1,000,000 each.

A complete list of colleges and junior colleges located in North Carolina is given on the following pages.

TABLE XXIV
INSTITUTIONS OF HIGHER LEARNING IN NORTH CAROLINA
1935-1936
Standard Four-Year Colleges (White)

Name	Location	Enrollment	Faculty	Endowment	State Appropriation	Value of Plant
Appalachian State Teachers College	Boone	907	35	\$	\$ 76,000.00	\$
Asheville Normal and Associated Schools . . .	Asheville	414	27			
Atlantic Christian College	Wilson . . . ✓ . . .	358	19	320,715.00		271,357.93
Catawba College	Salisbury	385	36	378,124.59		526,471.70
Chowan College	Murfreesboro . . .	115	20	55,000.00		249,215.00
Davidson College	Davidson	674	40	1,052,661.00		1,519,734.00
Duke University . . . ✓ . . .	Durham	3,350	344	29,880,267.00		
Elon College	Elon College . . .	442	25	476,000.00		1,198,000.00
East Carolina Teachers College	Greenville	1,034	51		106,365.00	3,000,000.00
Flora McDonald College	Red Springs . . .	314	28	130,064.83		283,433.21
Greensboro College	Greensboro	260	27	379,025.00		567,964.00
Guilford College	Guilford College	347	23	566,371.34		474,922.27
High Point College	High Point	546	26	210,000.00		715,000.00
Lenoir Rhyne College . . .	Hickory	354	22	330,132.00		632,962.00
Meredith College	Raleigh	505	46	488,981.88		1,914,269.11
Queens-Chicora College	Charlotte	364	24	320,000.00		730,000.00
Salem College	Winston-Salem . .	304	38	442,845.83		879,626.35
University of North Carolina ✓	Chapel Hill	3,028	277		655,376.00	10,000,000.00
State College of Agriculture & Engineering of the University of North Carolina	Raleigh	1,932	188		313,713.00	5,500,000.00
Woman's College of the University of North Carolina	Greensboro	1,790	149		286,299.00	6,595,587.00
Wake Forest College . . .	Wake Forest . . .	995	38	2,320,287.45		946,789.57
Western Carolina Teachers College	Cullowhee	509	35		52,648.62	956,783.48

TABLE XXIV (Cont'd)
 INSTITUTIONS OF HIGHER LEARNING IN NORTH CAROLINA
 1935-1936
 Standard Junior Colleges (White)

Name	Location	Enrollment	Faculty	Endowment	State Appropriation	Value of Plant
Belmont Abbey College	Belmont	125	20	\$ 275,000.00		\$ 275,000.00
Biltmore College	Asheville	137	9	*8,460.55		1,300,000.00
Boiling Springs Junior College	Boiling Springs	132	12	4,300.00		160,000.00
Brevard College	Brevard	448	26	60,000.00		240,000.00
Campbell College	Buie's Creek	275	15	9,000.00		413,000.00
Davenport College	Lenoir					
Lees-McRae College	Banner Elk	222	15	122,054.05		338,821.94
Louisburg College	Louisburg	262	16	58,785.08		326,949.89
Mars Hill College	Mars Hill	600	29	104,998.35		
Montreat College	Montreat	205	17			587,971.65
Mitchell College	Statesville	160	11	10,000.00		125,000.00
Oak Ridge Military Institute	Oak Ridge	150	12	91,721.32		275,300.00
Peace Junior College	Raleigh	190	20	**5,500.00		350,000.00
Pheiffer Junior College	Misenheimer	155	14	6,000.00		300,000.00
Pineland School for Girls	Salemberg	103	15	128,000.00		200,000.00
Presbyterian Junior College	Maxton	116	9	20,000.00		85,000.00
Rutherford College	Rutherford College	58	5	70,000.00		
St. Genevieve of the Pines	Asheville	52	13	205,000.00		200,000.00
St. Mary's School	Raleigh	157	14	139,625.15		421,463.38
Wingate Junior College	Wingate	180	22			112,857.00

*Tuition Only. **Pledged by Presbyterian Church.

Standard Normal Schools (Indian)

Name	Location	Enrollment	Faculty	Endowment	State Appropriation	Value of Plant
Cherokee Indian Normal School	Pembroke	61	7		\$ 21,215.00	\$ 200,000.00

TABLE XXIV (Cont'd)
 INSTITUTIONS OF HIGHER LEARNING IN NORTH CAROLINA
 1935-1936
 Standard Four-Year Colleges (Colored)

Name	Location	Enrollment	Faculty	Endowment	State Appropriation	Value of Plant
Agricultural and Technical College.....	Greensboro.....	565	33		\$ *26,300.00 37,250.00	\$ 1,105,000.00
Bennett College for Women.....	Greensboro.....	250	25	663,291.00		691,777.00
North Carolina College for Negroes.....	Durham.....	280	22		37,995.00	700,000.00
Johnson C. Smith University.....	Charlotte.....	369	29	1,751,719.90		1,045,146.07
Livingstone College.....	Salisbury.....	225	13	46,500.00		507,000.00
Shaw University.....	Raleigh.....	459	29	356,943.25		637,262.32
St. Augustine's College..	Raleigh.....	255	16	155,000.00		560,000.00
Winston-Salem Teachers College.....	Winston-Salem..	428	19		52,221.04	635,052.14

*Federal Appropriation.

Standard Junior Colleges (Colored)

Name	Location	Enrollment	Faculty	Endowment	State Appropriation	Value of Plant
Barber-Scotia College...	Concord.....	141	14	\$ 370,000.00	\$	\$ 344,890.00
Elizabeth City State Normal School.....	Elizabeth City..	529	18		10,990.00	489,568.00
Fayetteville State Normal School.....	Fayetteville....	547	17		27,075.00	460,785.00
Immanuel Lutheran College.....	Greensboro.....	49	8			150,000.00
Palmer Memorial Institute.....	Sedalia.....	63	8	118,000.00		402,000.00

CHAPTER V

PUBLIC WELFARE IN NORTH CAROLINA

The Public Welfare system of North Carolina is based on the county as an administrative unit, each county maintaining a public welfare board, juvenile court, and a whole or part-time superintendent of public welfare.

A brief review of public welfare work in the State will show the advancement made in this field. The North Carolina Board of Public Charities was established in 1868, but was not notably active for the next two decades, until Captain C. B. Denson became secretary of the organization. In 1917, the General Assembly created the North Carolina State Board of Charities and Public Welfare, while two years later an act was passed which made mandatory the organization of public welfare departments in each county and provided for the election of a county superintendent of public welfare. In 1919, too, a legislative enactment stipulated the creation of juvenile courts in each county, with the clerks of superior courts to act as judges.

Subsequent changes in the State Board of Charities and Public Welfare and modifications of the welfare system will be discussed more fully under the State and county sections of this report.

PUBLIC AND PRIVATE WELFARE IN NORTH CAROLINA

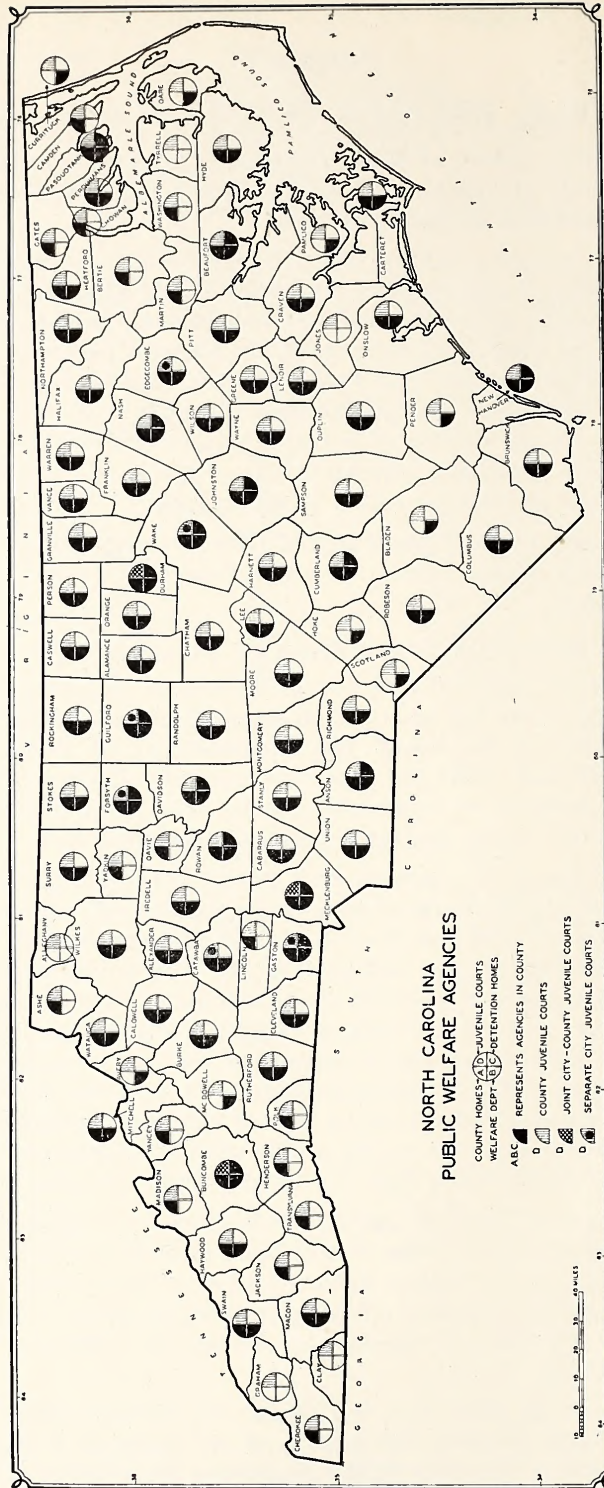
The State Board of Charities and Public Welfare is composed of seven members, elected by the General Assembly upon the recommendation of the Governor, who serves as an *ex officio* member of the Board. The Commissioner of Public Welfare acts as Director of the Board, and under the supervision of this officer, too, are conducted the activities of county directors of organization, field social work supervisors, consultants and field agents on negro work, and the functions of an office staff.

Under the State Board of Charities and Public Welfare operate the four major divisions of Child Welfare, in charge of overseeing institutions for dependent children, and related work; the Division of Field Social Work, supervising family case work directed toward rehabilitation, and certification for Federal benefits; the Division of Institutions and Corrections, responsible for supervision of State penal, correctional and charitable institutions; and the Division of Mental Hygiene, which superintends State hospitals for mental patients, as well as extending services to schools, juvenile courts, county and city welfare units. Working co-operatively with the State and county welfare authorities are various Federal, State, County and local agencies, where services are extended to the people through the county public welfare organizations and State institutions, functioning concurrently with the County Superintendent of welfare.

The county Boards of Charities and Public Welfare are composed of three non-salaried persons appointed by the State Board, these members advising and assisting the State body in the work in the county, making visitations and giving reports as the State Board requires, and acting in general advisory capacity to county and municipal authorities in dealing with problems of dependency, delinquency, distribution of funds, and general social conditions.

The County Board of Education and Board of Commissioners elect the county Superintendent of Public Welfare, for a term of two years at a salary designated by the electors. In counties of less than 32,000 population the election of this officer is op-

PLATE XII



tional, the Superintendent of county schools acting in this capacity *ex officio* if no Superintendent of Public Welfare is named. Duties of the position entail serving as chief school attendance officer, joint supervisor of funds for the poor, overseer of paroled prisoners, superintendent of dependent and delinquent children, and promoter of wholesome recreation.

As has been mentioned, the county departments of public welfare work co-operatively with the juvenile courts, county commissioners, county boards of education, farm and home demonstration agents, health departments, and various private social, religious, civic, patriotic and fraternal organizations.

PUBLIC COUNTY WELFARE

To date there are seventy-nine counties in North Carolina that have organized welfare departments, with full-time superintendents of public welfare, while in the remaining twenty-one counties the superintendent of public instruction acts as *ex officio* superintendent of welfare.

There has been notable progress in county welfare organization in the State during the last six months. In January, 1936, with the liquidation of ERA, a Federal grant was made to the State Board of Charities and Public Welfare for the purpose of strengthening the state and county welfare services. With this grant it was possible to match funds for establishing full-time departments and to finance the division of Field Social Work for eighteen months. Appropriations were made on July 1, in all but six of the one hundred counties, for continuing this service, and twenty-five counties elected full-time superintendents, taking advantage of this matching of funds.

County and city expenditures for welfare and relief for the year ended June 30, 1936, totaled \$1,818,939.09, which disbursements were made under the classifications as shown in the accompanying table.

TABLE XXV
EXPENDITURES FOR WELFARE AND RELIEF FOR YEAR
ENDED JUNE 30, 1936

Classification	Counties*	Cities**	Total
Emergency and Poor Relief.....	\$ 619,405.48	\$ 77,635.82	\$ 697,041.30
Mothers' Aid	30,121.57		30,121.57
Boarding Home Care	23,954.02	8,263.16	32,217.18
Hospitalization	324,257.85	72,817.09	397,074.94
Medical Care	98,346.19	62,109.69	160,455.88
Pauper Burials	40,754.48	3,656.00	44,410.48
Administrative Costs	240,669.77	35,531.37	276,201.14
All Other	65,613.66	115,102.94	180,716.60
(Reported as a Total Only)		700.00	700.00
Total	\$1,443,123.02	\$375,816.07	\$1,818,939.09

*Expenditures exclusive of County Home and Farm Maintenance for 95 counties.
**Expenditures for 19 cities of over 10,000 population according to 1930 census.

COUNTY HOMES

Eighty-six of North Carolina's hundred counties maintain county homes, supporting a total population, whites and negroes, of 3,448, of which number 123 are children. Of these institutions, the buildings and facilities of thirty-seven may be classed as adequate for the purposes to be served, while the remaining forty-nine fall somewhat below the desired standard. The maintenance of these buildings may be grouped as good, fair, and poor, with seventeen of the homes under this rating classed as good, thirty-one in the group of fair, and thirty-eight as poor.

Inmates of the homes receive services of physicians paid by the county, fourteen of the institutions listed being visited regularly and sixty-seven visited "on call." In five of the county homes a registered nurse administers general medical aid, while eleven establishments employ a practical nurse for these services. The remaining homes do not retain a full-time nurse, but in eighteen of the counties a matron performs these duties.

The total expenditures for maintenance of county homes in the State for the fiscal year 1935-1936 amounted to \$676,223.33, while the total value of this property for the same period is set at \$3,960,355.82. The monthly per capita cost per county for the fiscal year 1935-1936 ranged from \$6.49 for the lowest cost, to \$45.46 for the highest. Annual per capita costs for the period ranged from \$77.91 for the lowest cost, to \$545.49 for the highest, these figures being taken from the reports of county auditors. The wide variations in per capita costs are partially accounted for by the inclusion in some instances of the expense of repairs to buildings. The figures representing value of property and average daily population are admittedly estimates in some cases, but they may be accepted in general as fairly accurate. However, in the expenditures listed below, some counties were omitted in the computations for 1933 and 1934.

For the last few years the total operating expenses for these institutions have steadily increased. The calendar year 1933 showed expenditures of \$500,531.00, and 1934 revealed an increase to \$614,885.00, while in the fiscal year 1935-1936 the total amounted to \$676,223.33.

The county home population remains fairly constant, with a long-time trend of gradual increase. The average daily population of 3,448 as estimated by auditors is somewhat larger than the figure shown by the records of the Division of Institutions and Correction of the State Board of Charities and Public Welfare as of June 30, 1936, which placed the average at 3,117. This discrepancy is due to the auditors' occasional inclusion of prisoners serving sentences at county homes. However, per capita costs are calculated on the estimate of 3,448 as average daily population.

The mean annual per capita cost has increased from \$163.92 in 1933 to \$193.74 in 1934, and to \$196.09 in 1936. These figures are collected on a comparable basis each year, and except for irregular heavy expenditures for improvements to plants, reflect the general expense of the county. Various factors affect the per capita cost in the mass, such as the fact that additions and improvements to buildings and grounds, though fluctuating from year to year, are included in maintenance. Any overhead cost, such as interest on investment, depreciation of property, and insurance, would of course tend to raise the expense. Produce grown, which is consumed on the farm, is not included. However,

all money received from sale of farm products and turned in to the county treasurer is deducted from maintenance cost. The total amount of food consumed is greater than the money cost shown, due to consumption of produce raised on the farm. The reports for 1936 show estimates of \$140,434.87 so used. Too, in a few counties the homes operate a small tuberculosis section, which would necessarily raise the cost of operation and maintenance from the standpoint of the county home budget, thus increasing to some degree their per capita expense.

In counties where there is no home, the county either boards its wards in the institutions of adjoining counties, or else gives them a monthly allowance and the wards remain in their own homes, that of a relative, or some person in the local community.

JUVENILE COURTS AND DETENTION HOMES

The law of the State provides for the maintenance of a juvenile court in each county, with clerk of superior court as judge, to hear the cases of children under fourteen years of age and children between the ages of fourteen and sixteen years charged with a minor offense.

In North Carolina there are 108 juvenile courts, with clerk of the superior court acting in the capacity of judge for ninety-seven of these. Buncombe, Mecklenburg, and Durham counties have joint county-city courts, while Raleigh, Wilmington, High Point, Greensboro, Winston-Salem, Gastonia, Rocky Mount and Hickory have distinct city courts.

The county superintendent of public welfare acts as chief probation officer for the juvenile courts, there being now 100 chief probation officers and 35 assistants in the State.

To prevent the contact of children with adult criminals, the North Carolina statute asserts that provision for temporary care of delinquent juveniles shall be made in detention homes conducted as an agency of the court, or in private homes, boarding homes or other suitable places, such expense as may be incurred to be a public charge of the county.

Of the one hundred counties in the State, sixteen provide detention home care: namely, Anson, Beaufort, Buncombe, Cumberland, Davidson, Durham, Forsyth, Gaston, Guilford, Johnston, Mecklenburg, Nash, New Hanover, Pasquotank, Rowan, and Wake. Detention quarters for these sixteen counties come under four classifications: detained in county homes, detained in county jails, detained in city jails, detained in city-county juvenile court. Of these classifications, five counties use the county home, seven use the county jail, two the city jail, and one county uses the joint city-county court. The remaining counties in the State do not offer facilities for this type of care.

CHILD WELFARE WORK

In this division, a Director, with a staff of five, has supervision of institutions for dependent or neglected children, Maternity and Boarding Homes, administration of Mothers' Aid, registration of adoption and supervision of placement. In the first year of the biennium ending June 30, 1936, 1,800 children from 450 families received aid, paid

for out of State and county funds, in equal ratio. This work was carried on in 77 counties, and amounted to a total sum of \$59,258.08, or an average of \$16.43 per family. For the second year, the number of counties was 80, the expenditures \$62,357.12 and average monthly grant \$17.16. For the current year there are 84 counties participating.

At the present time, 13 counties maintain approved boarding homes, used for temporary care, pending court hearings, or for care of dependent neglected children. In these 13 counties were 28 licensed homes with capacity for 77 children in all.

STERILIZATION OF MENTAL DEFECTIVES

The law now provides that upon the initiative of the governing body or responsible head of a State institution, or a Board of County Commissioners, upon request of next of kin or legal guardian, and with the approval of the Commissioner of Public Welfare, the Secretary of the State Board of Health and the Chief Medical Officers of two State institutions for either feeble-minded or insane, an operation for sterilization or asexualization may be performed. Under the operation of this law from July 1, 1929, to July 1, 1936, 332 such operations have been performed. Since the new law went into effect there have been 348 new cases presented, of which 8 were rejected. North Carolina is one of twenty-nine states that have laws permitting sterilization of mental defectives.

DIVISION OF MENTAL HYGIENE

This division during the last biennium made case studies involving many conferences, examinations and interviews, on 1,150 persons, in State correctional, penal or charitable institutions, private institutions and public schools. Cases covered a wide range of mental and physical ailments, most of which were matters of mental hygiene.

Co-operative work was done with Samarcand Manor, where a large percentage of the girls were found to be mentally deficient and retarded in school work. Similar work was done in other State and private institutions. Work with the public school children has shown the very definite need for school and community programs for the special benefit of mentally sub-normal children. This division has also rendered valuable services in public addresses concerning mental hygiene.

PUBLIC AND PRIVATE INSTITUTIONS IN NORTH CAROLINA

The State of North Carolina operates the following institutions:

Institutions for Mental Defectives:

Caswell Training School.....	Kinston
State Hospital for Insane Negroes.....	Goldsboro
State Hospital for Insane (Central).....	Raleigh
State Hospital for Insane.....	Morganton

Institutions for Physical Defectives:

Orthopedic Hospital	Gastonia
Sanatorium	Sanatorium
Western North Carolina Sanatorium	Swannanoa

Homes for Aged:

Confederate Women's Home	Fayetteville
Confederate Soldiers' Home	Raleigh

Correctional Institutions:

Eastern Carolina Training School	Rocky Mount
Stonewall Jackson School	Concord
Home and Industrial School	Samarcand
School for Negro Girls	Efland
Morrison Training School for Negro Boys	Hoffman

Penal and Reformatory:

Women's Industrial Farm Colony	Kinston
State Prison System	

Schools for Blind and Deaf:

School for the Blind and Deaf (White)	Raleigh
School for the Blind and Deaf (Colored)	Raleigh
School for the Deaf	Morganton

Seventeen of these institutions, exclusive of the Prison system and the Western North Carolina Sanatorium (now building), were operated as follows:

Total Capacity	18,590
Total Number Inmates	17,651
Total on Waiting List	2,578
Total Revenues	\$2,546,058.81
Total Expenditures	\$4,433,250.80
Per Capita Cost per Day.....	\$1.18

ORPHANAGES

There are twenty-four orphanages in North Carolina, caring for children between the ages of two and nineteen years. Reports from fourteen of these institutions indicate a capacity for 3,216 children. They cared for 3,571 children, expending \$858,313.83 for the fiscal year 1934-35, an average cost per child of \$0.71 per day.

Many of these orphanages have extensive grounds, buildings, staff, and equipment, and have developed a very high standard of care and training for their children. Every effort is made to approach as nearly as possible to the home atmosphere.

Closely related to the orphanages are the child-placing agencies, of which there are two in the State, placing 208 children in the fiscal year 1935-36, at a cost of \$23,000.

In addition to these, there are two nurseries, two private clinics for the care and treatment of crippled children, four private hospitals for the insane, and four maternity homes. The data concerning these institutions is incomplete and no effort has been made to enumerate them all. Certainly when these institutions are considered and the large number of public and private hospitals is noted, it can surely be said that North Carolina people have been mindful of the needy and unfortunate, young and old, in their midst.

STATE BOARD OF HEALTH

The North Carolina State Board of Public Health was established in 1877, thus becoming the twelfth State Board to be organized in the country. The Board consisted of the entire State Medical Society, acted through a committee, and expended an annual appropriation of \$100. From that humble beginning, the work has constantly developed, adding from time to time provisions for examinations of public water, organization of County Boards, registration of vital statistics, publication of health information, a State Laboratory of Hygiene, distribution of sera and antitoxins, a Bureau of Venereal Diseases, school inspection, epidemiology, and other phases of public health work.

The State Board of Health is composed of nine members, four of whom are elected by the Medical Society of North Carolina, and five of whom are appointed by the Governor, each for a term of six years. The Board elects a president from its membership, and an executive committee consisting of the president and two members. The secretary-treasurer is elected by the Board from the registered physicians of the State, for a term of six years. He is the executive officer of the Board and is known as the State Health Officer. This State Health Officer heads the administrative unit which exercises the general supervision of the work performed. The work of the Health Department is divided into eight divisions which render service to the whole State. They are: Division of Laboratories, Division of Industrial Hygiene, Bureau of Vital Statistics, Division of Sanitary Engineering, Division of Epidemiology, Division of Preventive Medicine, Division of Oral Hygiene, and Division of County Health Work.

DIVISION OF LABORATORIES

This division occupies separate quarters in Raleigh, where are manufactured a large number of varieties of antitoxins, vaccines, and sera which are distributed daily throughout the State. Samples of public water supplies are given regular inspection analyses, and many other bacteriological and chemical analyses are made for diagnostic purposes. Perhaps one of the finest services rendered by this division has been in connection with the diagnosis of rabies, identification of specimens, and preparation of serum for Pasteur treatments. This work and other phases of the work will always be regarded as a memorial to Dr. Clarence A. Shore, whose pioneering spirit and scientific skill did much to advance the development of the science and growth of this division.

DIVISION OF INDUSTRIAL HYGIENE

The Division of Industrial Hygiene was organized in 1935, and \$10,000 was appropriated and placed in the hands of the State Health Officer for administering this legislation. An industrial hygiene program was begun with the understanding that the work would be taken over by the Public Health Service as soon as Social Security funds were available. The work began with the services of a physician and engineer, and later a secretary was employed. In 1936, when Social Security funds were made available, another physician and medical technician were added to the staff. Through the Social Security fund \$17,500 was added to the \$10,000 already in use, making a \$27,500 budget.

Thus far the work of this division of public health has been largely in investigating industrial plants with dust hazards, finding out the condition of workers already em-

ployed in asbestos textile industries and granite quarries, and giving pre-employment examinations to those workers who are about to enter such industries. Examinations were also given those employees already working in these industries.

Since the inauguration of the division, 150 plants involving siliceous dust hazards have been surveyed, in conjunction with the United States Public Health Service, five asbestos textile plants have been investigated, and one foundry study has been started. Five hundred and twenty-five asbestos textile workers and forty-six granite cutters were examined during the investigations and X-rays were taken of the chests of all examined. Analyses were made of 284 atmospheric dust samples.

BUREAU OF VITAL STATISTICS

The Bureau of Vital Statistics of North Carolina was organized in 1913, but no report was made before 1914. North Carolina was admitted to the Registration Area for Births in 1917. In 1931, the International List of Causes of Death was adopted, and deaths are now tabulated by counties and cities according to the legal residence of the deceased.

The personnel of the Bureau consists of the following: The State Health Officer, who is *ex officio* State Registrar of Vital Statistics; the Deputy State Registrar, who is the director of the Bureau of Vital Statistics; and a staff of seventeen clerical and office workers.

The total expenditure for the past year was \$21,798.58.

The primary registration districts of the State are the cities, incorporated towns and townships. Local registrars are appointed by the Board of County Commissioners and by the Mayors of the towns. All births must be reported to the local registrar within five days after birth, and all deaths before burial. These reports must reach the State Registrar by the fifth of the month. The local registrars receive a fee of fifty cents for each certificate recorded, authorized by the State Board of Health and paid by the county or town treasurer. Burial permits are given by the local registrar. In case of a suspicion of unlawful death the coroner should be notified and an inquest held. The State Board of Health furnishes the blanks and envelopes for registrars to send certificates to the Bureau of Vital Statistics.

DIVISION OF SANITARY ENGINEERING

This division consults with and advises public and private officials on questions relating to water supply, sewage disposal, and sanitary conditions. All plans and specifications for public water and sewerage improvements must be approved by the Chief Engineer of this Division. Engineers from this office advise and assist the operators and technicians attached to these plants. Sanitary and engineering matters relating to the enforcement of milk ordinances, malaria control, inspection of cafes, hotels, schools, swimming pools, jails, camps, manufacture and sale of bedding, are all administered by this division. Another important work has been the construction of modern sanitary privies throughout the rural areas of North Carolina. This division assists in the investigation of pollution, causes of epidemics, and other matters relating to public health.

DIVISION OF EPIDEMIOLOGY

This division collects and analyzes reports of communicable diseases and morbidity reports in an effort to anticipate if possible the occurrence of epidemics of disease. Studies are made of various epidemics, in order to discover new knowledge of the ways in which infection is spread or carried, that intelligent efforts may be made by quarantine and immunization to prevent recurrences or to reduce the ill effects. This division also assists and co-operates with other divisions on the control of malaria and venereal diseases.

DIVISION OF PREVENTIVE MEDICINE

This division publishes the Bulletin of Health, a regular educational pamphlet describing the work of the State Board and containing articles on Public Health. Supervision of school health, the practice and education of midwives, pre-natal care and clinics, dissemination of literature on preventable diseases are other important services of this division.

The service to crippled children is so important as to deserve additional description.

WORK FOR CRIPPLED CHILDREN

The work for Crippled Children was established in April, 1936, under the Division of Preventive Medicine of the State Board of Health. The purpose is to register all crippled children of the State, to provide surgical and medical care for these children, and to contact those children, under 21 years of age, needing orthopedic and plastic surgery care.

The State Board of Health, with the State Crippled Children's Commission as advisors, directs the work, which is handled through the North Carolina Orthopedic Hospital, location for clinics selected by the State Board of Health and general hospitals throughout the State. The State Board of Health supervises fifteen orthopedic clinics, twelve of which are operated by the Vocational Rehabilitation Department and three by the Division for this work. In addition to these fifteen clinics operated by the Division of Crippled Children, the Orthopedic Hospital treats crippled children and also conducts one clinic.

The field supervisors are employed to locate and contact crippled children in their homes, to help bring these children to the clinics, and to assist each clinic organization. They attempt to locate neglected crippled children, and it is their problem to get an understanding between patients, parents, and local officials. The clinics are conducted by the nine orthopedic surgeons recognized by the North Carolina Crippled Children's Commission. These surgeons are responsible for the necessary orthopedic treatment, including operations and after-care. Hospitalization is provided through general hospitals when it cannot be had at the North Carolina Orthopedic Hospital. There are twenty-four general hospitals in which crippled children of this State may be treated through the State orthopedic plan.

All agencies interested in the care of crippled children in the State are represented through the North Carolina Crippled Children's Commission, which acts in an advisory

capacity to the State Board of Health. It is composed of one representative from: the State Board of Health, the State Board of Charities and Public Welfare, the State Vocational Rehabilitation Department, the State Orthopedic Hospital, the State Medical Society and Orthopedic Surgeons in the State, the Medical Schools of the State, and county crippled children's organizations, and two representatives of the Civic Clubs in the State.

There is a local advisory committee for each State clinic. The Commission, with local advisory committee, brings together the Medical, Health, Nursing, and Welfare groups in a co-operative movement to carry out the State plan for aiding crippled children.

DIVISION OF ORAL HYGIENE

The Division of Oral Hygiene conducts mouth health programs in the public schools of the State, and the number of schools participating in these services is increasing, showing that definite progress is being made.

For the biennium 1932-1934, there were sixty-five counties benefitting by the mouth health programs. During the biennium the dentists examined 144,658, treated 80,977, and referred 34,615 to their private family dentists for further treatment. This division delivered 2,597 lectures on mouth health to an approximate attendance of 178,105.

During the fiscal year 1935-1936, there were twenty-one dentists who rendered dental care and mouth hygiene to school children. Of this number four are negroes. These services are given the counties that pay one-half the expenses of the twenty-one dentists. The counties that have not received these services in the past are realizing the aid rendered by them, therefore more of our counties are participating in these oral hygiene programs as arranged by the State Board of Health. For the fiscal year 1934-1935, there were thirty-one counties participating in oral hygiene programs. In these, a total of 67,550 children were examined, 39,350 children treated, and 15,977 were referred to local dentists for treatment.

For this fiscal year the State appropriated \$16,000 for the functions of this division. In addition to this State appropriation, appeal was made to the community groups throughout the State through lectures on oral hygiene and mouth health. Through contributions received at the lectures, and other contributions, \$28,983 was collected to use in this work in addition to the State appropriation of \$16,000.

The above services for the fiscal year 1935-1936 were rendered in thirty-nine counties and one city. For this fiscal year the State appropriated \$21,000 for this work, and in addition to this amount, \$40,888.23 was collected from private contributions.

DIVISION OF COUNTY HEALTH WORK

The work of the County Health Division consists of the development of local health organizations, the approval of budgets, the allocation of State funds, the supervision of county health departments, and the formation of policies and programs for the county health work.

For the fiscal year of 1935-1936, there were forty-eight counties, some of which were combined to form districts, that had full-time health services. The total amount of the appropriation was \$553,137.02, of which \$71,203.99 was allotted by the State and \$403,007.36 by the local units. The whole-time personnel consisted of forty-four health officers, three other medical officers, ninety-eight nurses, fifty-six inspectors, sixty-four clerks and other workers. These figures are exclusive of the cities of Asheville, Rocky Mount, Winston-Salem, Greensboro, High Point, and Charlotte. In addition to the forty-eight counties, there were five counties with only a nurse or a sanitary inspector as director of their local health program. Their total budget was \$14,599.73, of which \$2,341.50 was allotted by the State and \$10,218.23 was appropriated by local units.

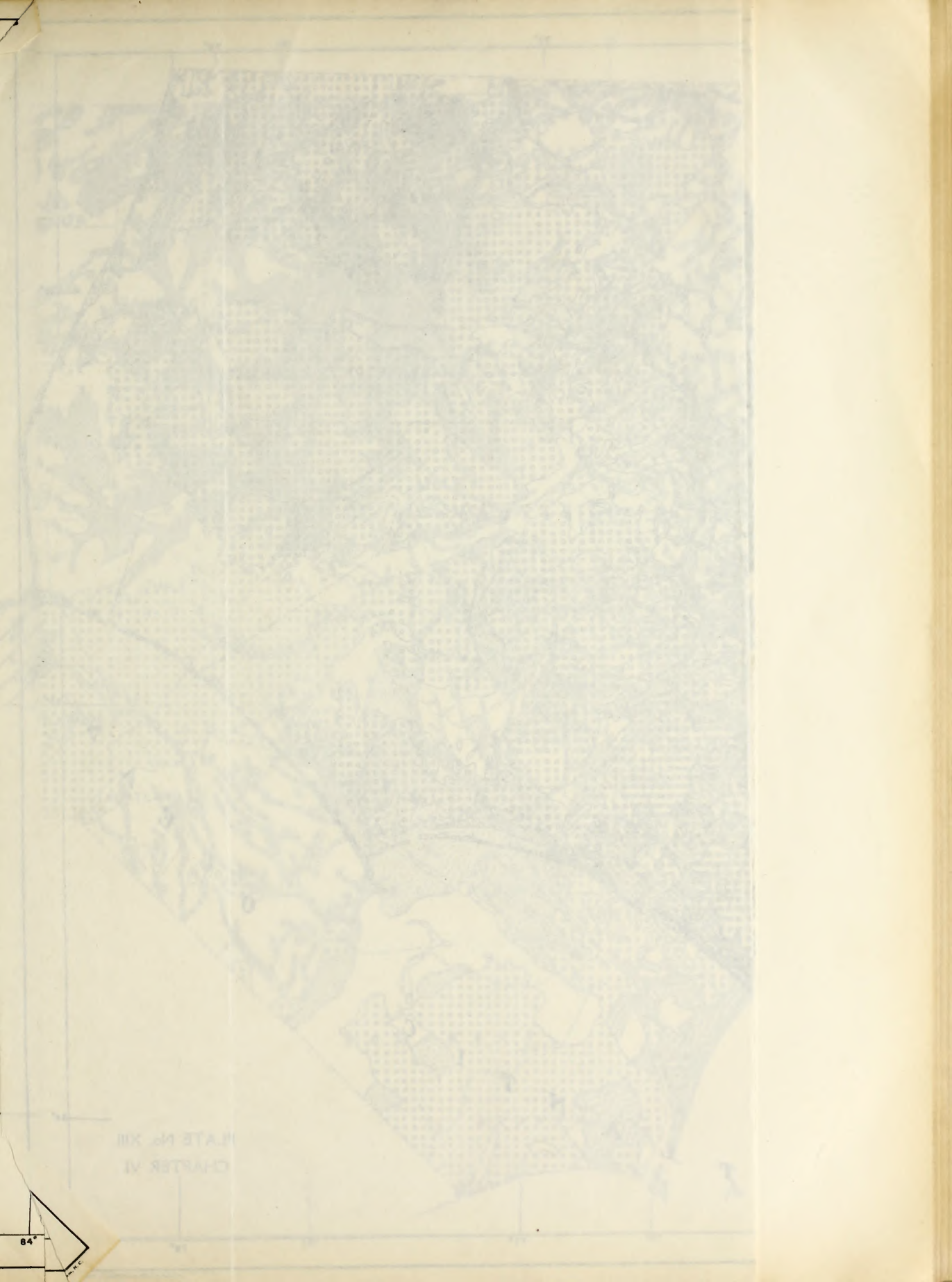


PLATE No. XIII
CHAPTER VI



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MAP OF NORTH CAROLINA

SCALE 1:500,000
0 10 20 30 40 MILES

DEPARTMENT OF SOILS
THE N. C. STATE COLLEGE
1935

J. F. LUTZ

C. B. WILLIAMS

LAND CONDITION MAP OF NORTH CAROLINA

LEGEND

- | | | | |
|---|--|---|--|
| ROCK OUTCROPS | MOUNTAINOUS LAND - A HIGH PERCENTAGE OF THIS IS TOO STEEP FOR CULTIVATION. | SANDS - MAINLY NORFOLK BUT INCLUDES PORTSMOUTH, HARRIS, LANE, WOOD, BERTON, LEON, ST. LOUIS, JOHNS, ORANGEBURG & BLANTON. | SHALLOW SOILS - SOILS WITH THE "C" HORIZON OR BEDROCK NEAR THE SURFACE. |
| ROUGH STONY LAND - IN PLACES SUPERIMPOSED ON STEEP LAND (NO. 1) INCLUDES MANY SMALL AREAS MAPPED AS "GRAVELLY PHASES" | SERIOUSLY ERODED - INCLUDES EROSION CLASSES NOS. 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. | POORLY DRAINED - INCLUDES MUCH GOOD AGRICULTURAL LAND IF ARTIFICIALLY DRAINED. | STEEP LAND (FEDMONT) - AREAS WITH A HIGH PERCENTAGE OF THE LAND TOO STEEP FOR CULTIVATION IN PLACES SUPERIMPOSED ON ROUGH STONY LAND (NO. 2) |
| PROMINENT HILLS. | SANDHILLS - ADAPTED TO TRUCK CROPS AND BRIGHT TOBACCO BUT NOT TO GENERAL CROPS. | GRAVEL HILLS | GOOD AGRICULTURAL LANDS. |

CHAPTER VI

AGRICULTURAL RESOURCES OF NORTH CAROLINA

SOILS AND ADAPTED CROPS

The fundamental agricultural resource of any state is the soil. Given a suitable temperate climate and a reasonably long growing season, the fertility of the soil and the adaptation of crops to make the best use of that fertility will determine the character and amount of agricultural wealth which can be produced. The primary step in securing the best possible program of classification and use for agricultural lands is therefore a thorough knowledge of the soils and their adaptability to various crop uses.

North Carolina was one of the first states in the Union to take up a systematic classification and mapping of its soil resources. This work was begun thirty-four years ago, and in the intervening period more than four-fifths of the total area of the State has been mapped and individual reports covering the soils and agriculture of each county in which the work has been completed have been issued and are available for consultation. Furthermore, because of the similarity of soils in the same regions, identification of soils in particular areas of the remaining counties can be readily made and their best adaptation determined.

SOILS

Soil scientists have come to the conclusion that the soil is largely a product of certain environmental factors, such as temperature, rainfall, topography, drainage, natural vegetation, and soil organisms. These factors impress themselves on the soil in varying degrees, depending upon time and the character of the parent geological material. For example, the soil derived from the granitic rocks of western North Carolina, where the temperatures are lower than in the Piedmont area, consists mainly of brown loams, with yellowish-brown friable subsoils. Identical rocks in the warmed Piedmont give rise to red clay loams or sandy loams, with compact red clay subsoils.

The climatic factors in North Carolina are very favorable, with generally a long growing season and abundant rainfall. The season in the eastern portion of the State is sufficiently early for the production of potatoes and truck vegetables for the early markets, and sufficiently long to allow for a second crop on the same land. About two-thirds of the State has a growing season long enough to produce cotton, this crop being grown in regions where the mean annual temperature is 58° or higher. The growing season throughout the State is long enough to permit the grazing of livestock through the greater part of the year, and except for a small area in the mountains, the winters are sufficiently mild to require little shelter for cattle and to allow for the grazing of cold-resistant grasses, clovers and dried forage. Even in those parts of the mountains where the season is short and temperatures low, the soils are fertile and well adapted to forage and short season crops. There are occasional dry seasons during which crops suffer from lack of moisture, and the flat eastern portion of the State sometimes further suffers from excessive rains, but moisture conditions are generally favorable. There are very few crop failures from these causes, and crops are seldom seriously damaged by hail or wind, or by abnormal frosts.

SOIL DIVISION

Soils may be classified physiographically by provinces, such as the Coastal Plain, and by divisions.

Soils of North Carolina will fall in the following classifications:

River Flood Plains

Bottoms subject to overflow
Second Bottoms or Terraces

Coastal Plain

Flatwoods
Upper Coastal Plains
Sand Hills

Piedmont Plateau

Soils from Crystalline Rocks
Slate Belt
Triassic Sandstone and Shale

Mountain

Valley Soils
Mountain Soils

Although these soil provinces and divisions are still used, the soil scientists prefer to distinguish soils as being in one of two divisions known respectively as the Pedalfer group (soils of humid regions containing accumulations of aluminum and iron), and as the Pedocal group (soils of arid and semi-arid regions containing accumulations of lime).

The Pedalfer soils are further divided into groups according to climate as follows:

Soil Group	Climate	Natural Vegetation
Tundras	Frigid	Sedges, Mosses, Shrubs
Podzols	Cold Temperate	Northern Evergreen Forests
Brown Forest	Temperate	Deciduous Forest
Prairie	Temperate	Tall Grasses
Red and Yellow	Warm Temperate	Mixed Forests
Laterites	Sub-Tropical	Mixed Forests

The soils of the Coastal Plain, Piedmont and Low Mountain Valley areas in North Carolina belong mainly to the Red and Yellow soil group. The true mountain soils of the Brown Forest group, and some Podzol soils are found at higher altitudes subject to lower temperatures. Some soils in New Hanover and Brunswick counties are nearly Lateritic in type.

Each soil is further divided into types based on texture and depth, and according to the proportions of sand, silt and clay, as coarse sand, fine sandy loam, clay loam, sandy clay, etc.

The following table is presented to show the extent of each individual soil group, and the largest types in each group as estimated for North Carolina.

TABLE XXVI
EXTENT OF VARIOUS SOIL GROUPS IN NORTH CAROLINA

COASTAL PLAIN	Acres
Group 1. Well Drained Sandy Loams	4,330,000
Norfolk Fine Sandy Loam	1,700,000
Norfolk Sandy Loam	1,360,000
Group 2. Fairly Drained Sandy Loams to Silt Loams	850,000
Dunbar Fine Sandy Loam	245,000
Dunbar Very Fine Sandy Loam	202,000

Group 3. Poorly Drained Sandy Loams	1,800,000
Portsmouth Fine Sandy Loam	592,000
Coxville Fine Sandy Loam	285,000
Coxville Very Fine Sandy Loam	188,000
Group 4. Poorly Drained Loams to Clays	1,009,000
Portsmouth Loam	368,000
Coxville Silt Loam	316,000
Bladen Loam	100,000
Group 5. Well Drained Sands	2,105,000
Norfolk Sand	1,130,000
Norfolk Fine Sand	532,000
Norfolk Sand (Sandhill Phase)	237,000
Group 6. Poorly Drained Sands	683,000
Portsmouth Sand	304,000
Portsmouth Fine Sand	241,000
Group 7. Organic Soils	921,000
Peat	593,000
Muck	327,000
Group 8. Miscellaneous	1,380,000
Swamp Soil	1,156,000
PIEDMONT REGION	
	Acres
Group 1. Sandy Loams with Red Clay Subsoils	2,172,000
Cecil Sandy Loam	1,464,000
Cecil Fine Sandy Loam	390,721
Group 2. Loams and Silt Loams with Red Clay Subsoils	1,530,000
Georgeville Silt Loam	658,000
Group 3. Red Clays to Clay Loams	3,217,000
Cecil Clay Loam	1,960,000
Cecil Sandy Clay Loam	416,000
Group 4. Sandy Loams with Yellow Subsoils	1,800,000
Durham Sandy Loam	385,000
Appling Sandy Loam	348,000
Wilkes Sandy Loam	186,000
Group 5. Loams and Silt Loams with Yellow Subsoils	935,000
Alamance Silt Loam	444,000
Alamance Gravelly Silt Loam	140,000
Group 6. Blackjack Soils	473,000
Iredell Loams	240,000
Iredell Fine Sandy Loams	121,000
MOUNTAIN REGION	
	Acres
Group 1. Upland Sandy Loams	335,000
Porters Sandy Loam	224,000
Group 2. Upland Loams to Clay Loams	3,532,000
Porters Loam	1,384,000
Porters Stony Loam	964,000
Ashe Loam	483,000
Group 3. Non Agricultural Soils	490,000
Group 6. Low Valley Clays	474,000
Other Groups	145,000
In addition to the above, there are 1,136,000 acres in Bottom Lands, and 514,000 acres in second terraces.	

EXPLANATORY NOTES

Numbers on legend of Plate XIV refer to types of soil as shown below.

Symbol

No. CLASS OF SOIL

1. High Mountain Soils
Mainly Ashe; includes small areas of Porters, Chandler, Talladega, Ranger, rough stony land, rock outcrop
2. Mountain Soils
Mainly Porters; includes small areas of Ashe, Chandler, Talladega, Burton, Clifton, Ranger, Habersham, Hartsells, Hagerstown, rough stony land, rock outcrop, Toxaway, Congaree

3. Red Clay Loams and Sandy Loams
Mainly Cecil; includes small areas of Talladega, Madison, Louisa, Surry, Durham, Appling, Wilkes, Helena, Congaree, Toxaway, Worsham, Wehadkee
4. Rough Stony Land and Rock Outcrop
5. Gray Sandy Loams
Durham, Appling, Wilkes, Helena; some Cecil, Congaree
6. Davidson Clay and Clay Loam
Includes Rabun clay loam in mountains
7. Black Jack Soils
Iredell, Mecklenburg, some Orange, Wilkes
8. Slate Soils
Georgeville, Alamance, Orange, Herndon, Goldston; includes some Helena, Wilkes
9. Gray Soils from Sandstone
Mainly Granville and White Store; includes some Wadesboro, Penn
10. Red Soils from Sandstone
Mainly Wadesboro and Penn; includes some Granville, White Store, Congaree, Bermudian
11. Second Bottom Soils
Wickham, Altavista, Roanoke, Cape Fear, Cahaba, Kalmia, Myatt, Okenee, Leaf
12. Sandhills
Norfolk, Hoffman, Ruston, Kalmia, Guin
13. Well to Fairly Well Drained Sandy Loams and Silt Loams
Mainly Norfolk; includes Marlboro, Ruston, Orangeburg, Greenville, Craven, Cuthbert, Susquehanna, Guin, Chesterfield, Bradley, Dunbar, Keyport, Onslow, Lenoir, Lufkin, Moyock, Elkton
14. Sands
Mainly Norfolk; includes Ruston, Orangeburg, Portsmouth, Hyde, Blanton, St. Lucie, Lakewood, Plummer, Onslow, St. Johns, Leon
15. Poorly Drained Sandy Loams, Loams and Silt Loams
Portsmouth, Hyde, Coxville, Bladen, Elkton, Susquehanna, Plummer, St. Johns, Parkwood
16. Swamp and First Bottoms
Peat, muck, Ochlocknee, Thompson, Johnston, Chastain

CROP ADAPTATION

As a result of many years of investigation, it is possible now to know in advance what crops are most suited to each of the many types of soils listed above, and to determine the proper kind and amount of fertilizer which must be used to secure certain crop production. This information has recently been published in very comprehensive form. (See Agricultural Experiment Station Bulletin 293). This information is most significant in pointing the way for a sound plan of promoting the growth of adapted crops and for establishing hitherto untried types of farming based upon specific soil requirements.

On Plate XIV will be found a map showing the crops adapted to various classes of soil in North Carolina, and accompanying notes showing the specific soil types to which these crops are best adapted. Reference should be had also to Extension Bulletin No. 208, in which will be found outlined an agricultural production program for each of eleven districts in the State. These programs are based on the type of farming generally practiced, and are designed to supply certain needs common to agriculture of the whole State.

AGRICULTURAL PRODUCTION

One of the symbols on the Great Seal of the State of North Carolina is a cornucopia, or "horn of plenty." Pouring forth are fruits and vegetables of all kinds, representing the wide range of agricultural commodities that are raised here.

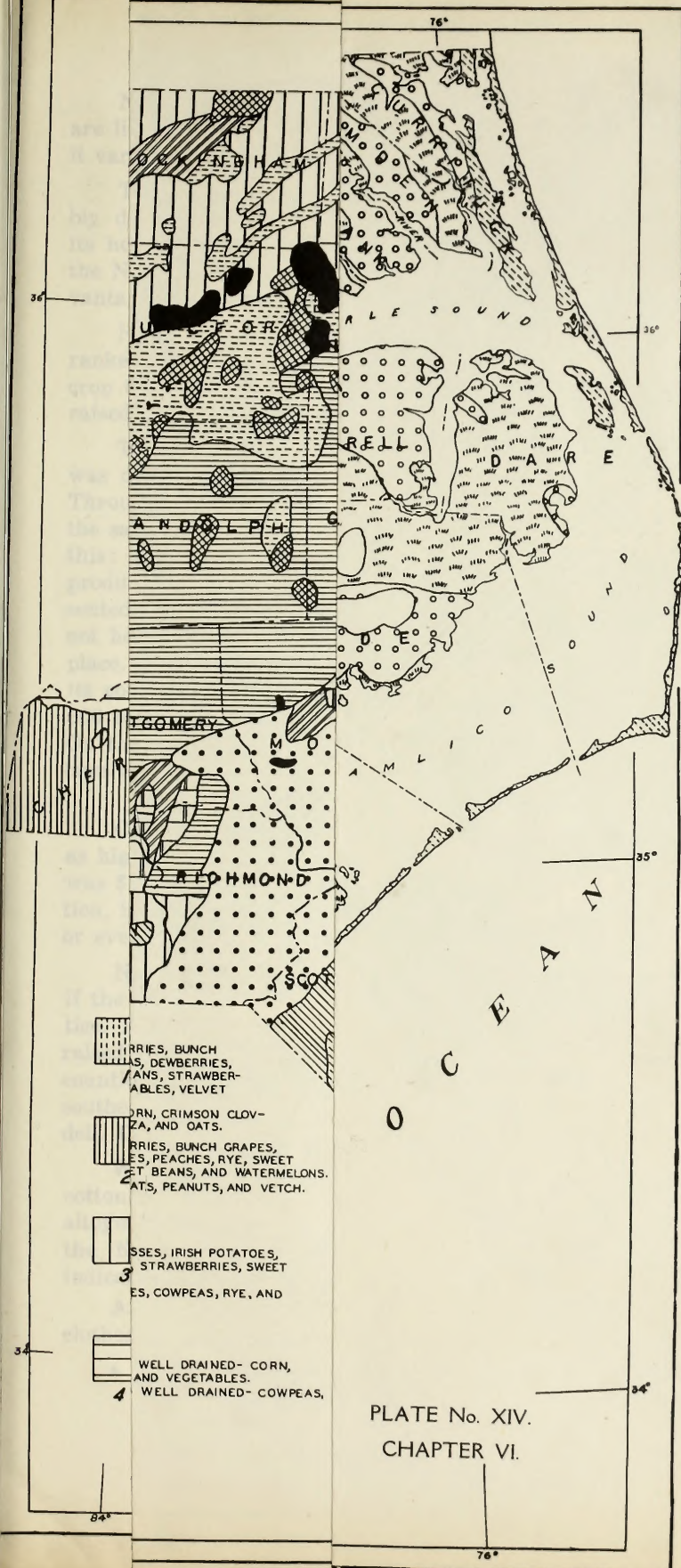


PLATE No. XIV.
CHAPTER VI.

3. Red Clay Loams and Sandy Loams
Mainly Cecil; includes small areas of Talladega, Madison, Louisa, Surry, Durham, Appling, Wilkes, Helena, Congaree, Toxaway, Worsham, Wehadkee
4. Rough Stony Land and Rock Outcrop
5. Gray Sandy Loams
Durham, Appling, Wilkes, Helena; some Cecil, Congaree
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MAP OF NORTH CAROLINA

SCALE 1:500,000

DEPARTMENT OF SOILS
THE N. C. STATE COLLEGE
1935

C. B. WILLIAMS

J. FLUTZ

LEGEND

CROPS ADAPTED TO VARIOUS SOIL CLASSES IN NORTH CAROLINA

- | | | | | | | | |
|---|--|---|--|----|---|----|---|
| 1 | (A) PARTICULARLY WELL SUITED-APPLES, BUCKWHEAT, BUNCH GRAPES, GRASSES, IRISH POTATOES, AND VEGETABLES
(B) MODERATELY WELL SUITED-ALFALFA, CORN, CRIMSON CLOVER, LESPEDEZA, OATS, PEACHES, RED CLOVER, AND SOYBEANS. | 5 | (A) PARTICULARLY WELL SUITED-BLACKBERRIES, BUNCH GRAPES, CANTALOUPE, COTTON, COWPEAS, DEWBERRIES, PEACHES, RYE, SWEET POTATOES, TOBACCO, VEGETABLES, AND WATERMELONS.
(B) MODERATELY WELL SUITED-APPLES, CORN, IRISH POTATOES, LESPEDEZA, OATS, SOYBEANS, STRAWBERRIES, AND VELVET BEANS. | 9 | (A) PARTICULARLY WELL SUITED-BLACKBERRIES, CANTALOUPE, COTTON, COWPEAS, DEWBERRIES, LESPEDEZA, OATS, PEACHES, RYE, TOBACCO, VEGETABLES, VETCH, AND WATERMELONS.
(B) MODERATELY WELL SUITED-APPLES, BUNCH GRAPES, CORN, CRIMSON CLOVER, AND SOYBEANS. | 13 | (A) PARTICULARLY WELL SUITED-BLACKBERRIES, BUNCH GRAPES, CANTALOUPE, COTTON, COWPEAS, DEWBERRIES, LESPEDEZA, OATS, PEACHES, RYE, TOBACCO, VEGETABLES, VETCH, AND WATERMELONS.
(B) MODERATELY WELL SUITED-APPLES, BUNCH GRAPES, CORN, CRIMSON CLOVER, AND SOYBEANS. |
| 2 | (A) PARTICULARLY WELL SUITED-APPLES, BUCKWHEAT, BUNCH GRAPES, BURLEY TOBACCO, CORN, CRIMSON CLOVER, FLOWERING BULBS (ON CONGAREE), GRASSES, IRISH POTATOES, OATS, RYE, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-ALFALFA, BLACKBERRIES, CANTALOUPE, COWPEAS, DEWBERRIES, LESPEDEZA, PEACHES, RED CLOVER, SOYBEANS, AND WATERMELONS. | 6 | (A) PARTICULARLY WELL SUITED-ALFALFA, BARLEY, COTTON (IN LOWER PIEDMONT), CRIMSON CLOVER, CORN, GRASSES, LESPEDEZA, OATS, PEACHES, RED CLOVER, RYE, VEGETABLES, VETCH, AND WHEAT.
(B) MODERATELY WELL SUITED-APPLES, BLACKBERRIES, BUNCH GRAPES, COWPEAS, DEWBERRIES, IRISH POTATOES, SOYBEANS, AND STRAWBERRIES. | 10 | (A) PARTICULARLY WELL SUITED-APPLES, BLACKBERRIES, CANTALOUPE, COTTON, COWPEAS, DEWBERRIES, LESPEDEZA, OATS, PEACHES, RYE, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-ALFALFA, CRIMSON CLOVER, PEACHES, RED CLOVER, SOYBEANS, AND VETCH. | 14 | (A) PARTICULARLY WELL SUITED-BLACKBERRIES, BUNCH GRAPES, CANTALOUPE, COWPEAS, DEWBERRIES, LESPEDEZA, OATS, PEACHES, RYE, SWEET POTATOES, TOBACCO, VEGETABLES, VETCH, AND WATERMELONS.
(B) MODERATELY WELL SUITED-COWPEAS, OATS, PEACHES, RYE, AND WHEAT. |
| 3 | (A) PARTICULARLY WELL SUITED-APPLES, BARLEY, COTTON (IN LOWER PIEDMONT), CORN, GRASSES, LESPEDEZA, PEACHES, RYE, SOYBEANS, TOBACCO, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-BLACKBERRIES, CANTALOUPE, CORN, CRIMSON CLOVER, DEWBERRIES, IRISH POTATOES, OATS, RED CLOVER, STRAWBERRIES, SWEET POTATOES, AND WATERMELONS. | 7 | (A) PARTICULARLY WELL SUITED-ALFALFA, APPLES, BARLEY, COTTON (IN LOWER PIEDMONT), CORN, GRASSES, LESPEDEZA, OATS, PEACHES, RED CLOVER, RYE, VEGETABLES, VETCH, AND WHEAT.
(B) MODERATELY WELL SUITED-APPLES, BLACKBERRIES, BUNCH GRAPES, COWPEAS, DEWBERRIES, IRISH POTATOES, SOYBEANS, AND STRAWBERRIES. | 11 | (A) PARTICULARLY WELL SUITED-APPLES, BLACKBERRIES, CANTALOUPE, COTTON, COWPEAS, DEWBERRIES, LESPEDEZA, OATS, PEACHES, RYE, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-ALFALFA, CRIMSON CLOVER, PEACHES, RED CLOVER, SOYBEANS, AND VETCH. | 15 | (A) PARTICULARLY WELL SUITED-CORN, GRASSES, IRISH POTATOES, LESPEDEZA, OATS, PEACHES, RYE, SOYBEANS, STRAWBERRIES, SWEET POTATOES, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-CANTALOUPE, COWPEAS, RYE, AND WATERMELONS. |
| 4 | NOT SUITED FOR GROWING CROPS. | 8 | (A) PARTICULARLY WELL SUITED-APPLES, COWPEAS, CRIMSON CLOVER, GRASSES, LESPEDEZA, OATS, PEACHES, RED CLOVER, RYE, VEGETABLES, AND WHEAT.
(B) MODERATELY WELL SUITED-ALFALFA, BUNCH GRAPES, CANTALOUPE, CORN, COTTON, SOYBEANS, STRAWBERRIES, AND TOBACCO. | 12 | (A) PARTICULARLY WELL SUITED-BLACKBERRIES, BUNCH GRAPES, CANTALOUPE, DEWBERRIES, MUSCADINES, PEACHES, RYE, SWEET POTATOES, TOBACCO, VEGETABLES, VELVET BEANS, AND WATERMELONS.
(B) MODERATELY WELL SUITED-COWPEAS, OATS, PEACHES, AND VETCH. | 16 | (A) PARTICULARLY WELL SUITED-FOR PART WELL DRAINED-CORN, GRASSES, IRISH POTATOES, SOYBEANS, AND VEGETABLES.
(B) MODERATELY WELL SUITED-FOR PART WELL DRAINED-LESPEDEZA, AND OATS. |

NOTE- FOR EXPLANATION OF LEGEND AS APPLIED TO "CLASSES OF SOILS IN NORTH CAROLINA" SEE TEXT

PLATE No. XIV
CHAPTER VI

North Carolina's natural resources, translated in terms of agricultural products, are limited to no one section of the State and have a permanent value which, although it varies from year to year, ranks among the highest in the entire union.

This State's crops have approximated the half-billion-dollar mark in the past, notably during the period immediately following the World War, when inflation was at its height. However, North Carolina's crops are always worth more than those of all the New England states combined. This statement will serve to show the natural advantages which accrue to North Carolina and find expression in its field products.

North Carolina, in 1935, ranked fifth in the value of its farm products, while it ranked third in the matter of gross income and third in cash income. Practically every crop that can be raised between Florida and the frigid areas of the far north can be raised in North Carolina, to a greater or less degree.

There was a time when North Carolina, in common with the other southern states, was dependent upon cotton for the bulk of its farm income. This is no longer the case. Through voluntary reduction, this State has gradually cut its cotton acreage and, at the same time, it has seen fit to take advantage of other crops. Here is an example of this: last year, that is, in 1935, the total cash or sales value of North Carolina's farm products, including 78 crops, was \$281,504,000. Of this amount, only \$32,873,000 represented the gross income from cotton lint. This does not mean that North Carolina has not held its own as a cotton producing state, but rather has placed cotton in its proper place, as a part of a balanced agricultural system. North Carolina voluntarily reduced its cotton acreage 48 per cent, beginning in 1926, bringing the total down from 1,802,000 to 903,000. This does not mean that North Carolina has abandoned its cotton crop. On the other hand, its farmers have recognized one of the most important economic laws and have governed themselves accordingly.

COTTON

Cotton, then, continues to be one of the State's leading crops. In 1919, it brought as high as 35 cents a pound, while the total value of the crop in this State that year was \$130,000,000. In 1923, the total was \$149,000,000, but that was in a period of inflation, before the stabilizing influences recently brought into play were put into operation or even contemplated.

North Carolina always has and always will offer the cotton farmer inducements, if the cotton farmer in turn accepts sound economic principles and puts them into practice. The average yield per acre in this State has run as high as 328 pounds. Cotton is raised in abundance and with success over a vast area of the State, principally in the counties from Chatham, Durham, Granville and Moore to the coast, and along the southern border counties, from Robeson to Polk and northward into Alexander, Iredell, Davie, and Davidson. Very little is raised on the coast.

While North Carolina has been gradually swinging away from its dependence upon cotton, especially during the past decade, yet this is one staple crop that will never be altogether abandoned. On the contrary, it will be more judiciously utilized; it will become the North Carolina farmer's servant but never again his master, unless present indications fail.

As early as 1708, North Carolina seems to have grown enough cotton to supply clothes for at least one-fifth of its population at that time, but it appears from the best

available records that cotton growing was first introduced into the State by Sir John Yeaman, along the Cape Fear River, in 1685, when he was placed in charge of Clarendon County. Each colonist grew a small patch, which was picked, carded and spun, then woven into cloth or knitted into hose for the members of the family. At that time, growing, ginning, spinning and weaving were all done by hand on the farm. Ginning was one of the evening's chores, performed by the "shoe-full." Little or no cotton was sold in North Carolina at that time.

In this connection, it is interesting to note that in 1789 Nathaniel Macon, then a member of Congress from this State, proposed a tariff on cotton, to protect the southern states against importations from the West Indies and Brazil. This bill was defeated.

North Carolina's cotton history is linked with Eli Whitney's gin, which invention revolutionized the conversion of the raw material into the finished product. It was not until this device was perfected and put into use that cotton manufacturing became an "industry." It may be stated in passing that the North Carolina Legislature of 1804 bought the patent rights—which Whitney himself peddled around—for this State, paying \$30,000 for them. They cost South Carolina \$50,000.

In 1790 the price of cotton in North Carolina was 26 cents a pound. Nine years later it was 44 cents. Cotton patches grew into 1,000-acre fields. The planters of a few acres in 1780 had become landlords of vast estates by the beginning of the nineteenth century.

From 1801 to 1910, cotton production in North Carolina grew as follows:

1801.....	8,000 bales	1850.....	73,845 bales
1811.....	14,000 bales	1860.....	145,514 bales
1821.....	20,000 bales	1870.....	144,935 bales
1826.....	20,000 bales	1894.....	479,441 bales
1834.....	19,000 bales	1900.....	502,825 bales
	1910.....		675,000 bales

Three times since 1910 production has exceeded a million bales, in 1911, 1923, and 1925.

The lowest total received for a cotton crop was \$2,431,643 in 1900.

TOBACCO

Another agricultural pursuit in North Carolina that furnishes the raw material for one of the world's biggest industries is tobacco farming, which in the past several years has become more nearly stabilized than ever before. This is a crop that involves billions of dollars, including the receipts from tobacco sales and receipts from the output of the mammoth factories located in North Carolina.

Tobacco has presented its knotty problems, but the trend has been toward a more intelligent handling of this product, both on the part of the farmer and his advisers. North Carolina holds first place in tobacco production, and there is every indication that it will continue to do so. Acreage and production adjustments of the past quadrennium do not mean that North Carolina will relinquish its leadership in tobacco production. These readjustments have only served to insure a perpetuation of that leadership, by making it possible for the farmer to continue to raise the vast amounts necessary, at a reasonable profit.

Hundreds of millions of dollars have been realized from tobacco in North Carolina in past years. As far back as 1866 the crop, at 14.3 cents a pound, brought \$5,637,618. The largest amount ever reported from a single year's crop was \$174,333,000 in 1919, when the average was 53.6 cents a pound. In 1931-32, prices dropped to where the season's average for the entire State was only 9.16 cents a pound. In 1935 the average was 20.3 cents a pound, the crop of 577,435,000 pounds bringing \$117,443,000, while the previous season the average was 28.5 cents, and the State's 416,840,000 pound crop yielded a total income of \$118,808,000. The 1933 value was a little better than \$86,000,000, the two following years showing a healthy increase. The 1936 season started off with average prices better than 21.93 cents a pound.

Tobacco is raised extensively over the northern Piedmont section of the State and the central part of the Coastal Plain, also along the South Carolina border, and (burley) in the mountain areas. For all time it has been one of the State's leading crops, but not until comparatively recent years has its income surpassed that yielded by cotton. Tobacco is now first and cotton second, in point of revenue received by the State's farmers.

There are forty tobacco markets in North Carolina, each with adequate warehouse facilities, where farmers can take their product and sell it at prevailing prices. These are distributed throughout four belts. There is the belt known as the "Old Bright Belt," in which are the market towns of Burlington, Mebane, Durham, Winston-Salem, Louisburg, Oxford, Sanford, Aberdeen, Carthage, Roxboro, Madison, Reidsville, Stoneville, Mount Airy, Henderson, Fuquay Springs, Wendell and Warrenton.

In the belt known as the "New Bright Belt" are found Washington, New Bern, Wallace, Tarboro, Ahoskie, Smithfield, Kinston, Robersonville, Williamston, Rocky Mount, Farmville, Greenville, Goldsboro, and Wilson.

Next is what is known as the "Border Belt," in which are located the market towns of Clarkton, Chadbourn, Fair Bluff, Tabor City, Whiteville, Fairmont, and Lumberton; while the tobacco of the "Burley Belt" is sold principally at Asheville.

TABLE XXVII
NORTH CAROLINA TOBACCO WAREHOUSE SALES REPORT
1935-1936

Belt	Markets	Warehouse	Total Sales	Average Price
Old Bright Belt	18	73	\$218,940,801	\$19.50
New Bright Belt	14	66	316,364,709	20.86
South Carolina Belt	7	30	80,446,170	20.54
Burley Belt	1	3	2,929,410	21.30
STATE SUMMARY				
To October 1, 1936	30	139	144,979,781	21.93
Season				
1935-1936	40	172	618,681,090	20.34
1934-1935 .....	..	157	438,324,510	28.44
1933-1934 .....	..	148	564,628,084	15.93
1932-1933 .....	..	136	321,192,969	11.98

CORN

Corn, one of the great crops of the State, from which \$32,016,000 was realized in 1935, is grown in every one of the one hundred counties that comprise North Carolina. It was found here when the white man came, and it has remained a staple crop, with annual production ranging from 20,000,000 to 60,000,000 bushels, dating as far back as the close of the Civil War. Corn has brought as high as \$1.85 a bushel, but that was in 1919. The previous year, 1918, the last year of the World War, it brought the enormous sum of \$112,625,000.

With corn growing in every county, North Carolina finds itself in a position where it should never import a single grain. Some of the finest corn land to be found anywhere in the world is found in this State.

MINOR CROPS

Thus there has been presented to the reader a picture of what are commonly accepted as the three "staple" crops in North Carolina. But these do not complete the agricultural picture of the State by any means.

Here are the crops that are successfully raised in North Carolina:

Alfalfa	Cranberries	Mint	Soybeans
Apples	Cabbage	Onions	Strawberries
Artichokes	Cucumbers	Oats	Sweet Potatoes
Asparagus	Cherries	Okra	Snap Beans
Barley	Peaches	Pears	Spinach
Beets	Celery	Parsnips	Sugar Cane
Blackberries	Collards	Peanuts	Sorghum
Blueberries	Dewberries	Pumpkins	Squash
Butterbeans	English Peas	Plums	Thyme
Buckwheat	Egg Plants	Peppers	Tobacco
Carrots	Figs	Parsley	Turnips
Cauliflower	Hay	Quinces	Tomatoes
Cotton	Irish Potatoes	Radishes	Velvet Beans
Cowpeas	Kale	Lettuce	Vetch
Cantaloupes	Kudzu	Rape	Watermelons
Chard	Lespedeza	Rye	
Clover	Mustard	Raspberries	

Why this variety of crops, successfully raised? One outstanding reason is the ideal climate prevailing in North Carolina. Climate is essentially a ruling factor in the agricultural world.

North Carolina, agriculturally, climatically, and in some other respects, is divided into three grand-divisions, each with its distinct agricultural advantages. Consider briefly these three sections, known as the Coastal Plain, the Piedmont Region, and the Mountain Region, in relation to their agricultural opportunities.

A variety of crops thrive in the mountainous regions of the State, including corn, wheat, tobacco and vegetables of many kinds. The annual mean temperature for the

entire region is 55 degrees, and tornadoes are unknown. These conditions not only encourage agricultural pursuits but make this section one of the playgrounds of America.

The chief agricultural products of the Piedmont are grain, including wheat, rye, oats and buckwheat; fruits, vegetables, tobacco and cotton. Apples grow in abundance here as in the higher regions, while in some sections peaches thrive, as well as grapes. The Sand Hill Region, which lies between the higher levels of the Piedmont and the Coastal Plain, is noted for the millions of bushels of peaches, shipped annually to northern and eastern markets; and it is in this section that the opportunity exists for the establishment of large canneries, in order that the fruit may be preserved at the place where it is grown instead of being shipped away to be processed. Inquiry into this situation on the part of prospective operators would disclose conditions ideal for those wishing to come to North Carolina for this purpose. Also, in the Sand Hills dewberries grow in abundance, large and luscious, capable of furnishing natural juices in great abundance. This small fruit also is canned and preserved with great success, and thus processed is very useful for winter consumption.

Considering for a moment the agricultural advantages of central and southeastern North Carolina, there is found here a vast area comprising 22,000 square miles, where climatic conditions are favorable and opportunities abound. This section includes some of the richest farming lands in eastern America, and due to the abundance of early truck produce here, the opportunity also exists for the establishment of canneries in this section of the State, which supplies the tables of many large cities with some of the finest strawberries to be found anywhere in the world. Among these is the famous Blakemore variety, recently developed by the State Department of Agriculture in co-operation with the State College of Agriculture and the United States Department of Agriculture, on the Coastal Plain Test Farm at Willard. The Missionary, the Klondyke and other well-known berries are shipped from this section, but they could just as easily be canned and preserved in the areas in which they are grown, under conditions that are ideal for manufacturing sites, both as to location, natural advantages, and the best of transportation facilities to outside markets.

During the past three years, the value per acre for strawberries has grown to \$242, from less than \$200. This eastern North Carolina crop is worth commercially approximately \$2,000,000 a year, and with the heartening conditions that are confronting agriculture, promise to be worth more in the future, especially with the steady development of larger and better berries.

Referring again to the advantages of this central-southeastern section of the State, it is pointed out that zero temperatures here are unknown. The date of the first killing frost varies from October 15th, on the western border of the area, to November 15th at Southport, where the annual mean temperature is well above 60 degrees. Some winters pass without temperatures much below the freezing point. This means an exceptionally long growing season. Some of the largest and most productive farms in the State are found in this section, where cotton, corn, peanuts, tobacco, soybeans, potatoes, and a profusion of early truck are grown annually.

Below are given some of North Carolina's outstanding opportunities in the form of diversified crops and the amounts of money each brought in 1935, according to figures appearing in one of the publications of the State Department of Agriculture:

Winter Wheat	\$5,146,000	Soybeans for grain	
Oats	2,649,000	(equivalent sold) less hay	1,232,000
Barley	198,000	Soybeans, total	
Rye	426,000	(equivalent sold) less hay	3,080,000
Buckwheat	46,000	Cowpeas, less hay	1,162,000
Sorghum, for syrup	956,000	Peanuts, total	8,758,800
Sorghum, for forage	324,000	Apples (agricultural total) ..	3,061,000
Irish Potatoes	5,557,000	Apples (commercial)	600,000
Sweet Potatoes	5,600,000	Peaches	2,095,000
Clover Seed	576,000	Pears	200,000
Clover and Timothy	952,000	Grapes	251,000
Alfalfa	240,000	Pecans	157,000
Lespedeza	1,256,000	Snap beans	562,000
Soybeans, for hay	2,159,000	Cabbage	164,000
Cowpeas, for hay	1,265,400	Cantaloupes	202,000
Peanuts, for hay	1,900,000	Cucumbers	176,000
Annual legumes	5,324,400	Green peas	141,000
Grains cut for hay	742,500	Tomatoes	101,000
Miscellaneous tame hay	1,170,000	Watermelons	234,000
All tame hay (total)	9,519,000	Peppers	128,000
Wild hay	214,000	Strawberries	1,694,000
All hay	9,733,000		

The truck crops reported above do not include home gardens nor production from sections not recognized as commercial shipping areas.

From this summary, however, the prospective settler in North Carolina may be quick to sense numerous opportunities for specializing in the production of certain crops which are easily grown in the State and which have not been raised in quantities sufficient to glut the markets. In the general trend which has shown such fruitful results in North Carolina during the past few years, it is essential that crops be adapted to the needs of the people and that the people supply themselves with those commodities which can be most easily and economically produced.

No section of the United States is better suited to the production of pecans, which present such an outstanding opportunity, than North Carolina. Already this industry has gained a foothold and proved profitable in several sections, but there is room for the expansion of this industry. While many trees yielding other products run their course and die within a comparatively short time, the pecan tree is young at 25 years and often lives to be more than 100 years old, sometimes even 200. It has been demonstrated that a few well-cared for pecan trees will pay the taxes on an average farm. They require little attention except in the early stage. A tree in Scotland County eight years old produced 40 pounds of choice thin-shelled nuts in a single year. A tree in Raleigh eleven years old produced 90 pounds, while a large tree in Elizabeth City was known to produce 400 to 700 pounds of choice nuts annually. A grove of 30 acres in a county in the southeastern part of the State produced 16,000 pounds in a single year, and the nuts sold on an average of 50 cents a pound. While the growing area is limited, the pecan market extends all over the world.

Fruit culture also is destined to receive larger attention in the future. No section of the United States is better adapted to this pursuit; none offers finer opportunities. There is hardly a section of the State in which fruit of some description cannot be raised, whether for table use or for commercial purposes.

TABLE XXVIII
OCTOBER 1 CROP REPORT
(Thousands omitted)

North Carolina	Production		Indicated
Crops	1928-32	1935	1936
Corn, bu.	38,415	47,082	44,918
Wheat, bu.	3,790	5,876	5,092
Oats, bu.	3,572	5,160	3,600
Barley, bu.	361	171	170
Buckwheat, bu.	58	60	40
Tame hay, tons	565	694	622
Pasture ....	..	..	..
Alfalfa hay, tons	10	14	13
Tobacco, lbs.	469,135	577,435	463,420
Soy beans, bu.	1,230	1,232	1,606
Cowpeas, bu. ....	..	..	..
Peanuts, lbs.	246,206	264,500	260,150
Pecans, lbs.	724	900	1,100
Irish potatoes bu.	7,540	9,095	6,068
Sweet potatoes, bu.	7,141	9,300	8,360
Apples, total, bu.	3,411	3,975	2,590
Peaches, bu.	1,205	1,781	1,525
Pears, bu.	207	222	181
Grapes, tons	4,305*	3,864*	4,500*

*Grape production given in actual figures, thousands not omitted.

LIVESTOCK

The interest in livestock in North Carolina has been rapidly increasing for the past twenty years. This has been shown by the number of registered animals brought into the State and the high average prices paid for them.

There seems to be no question that a greater agriculture in North Carolina depends very largely upon the quite general adoption of a better balanced agriculture through the intelligent extension of diversified farming. In approximating the best type of diversified farming, livestock is destined to become increasingly important as a factor in establishing our agricultural industry on a basis economically sound and profitable.

Diversified farming with some form of livestock offers steady employment throughout the entire year and brings money to the farmer during each month of the year.

On January 1, 1935, the United States Census of Agriculture reports 684,266 cattle of all ages, of which number 467,012 were over three months old. These were valued at \$14,035,056. The corresponding figures for April 1, 1930, were 532,631 valued at \$23,483,726. This represents an increase of 151,635, or nearly thirty per cent. The

average number reported per farm had increased from 2.9 to 3.3 over this period. This rate of increase may be compared with that of the United States as a whole for this period of 7.0 per cent.

In recent years there has been an increased interest in beef cattle in eastern North Carolina. This interest has been aroused principally because results from the Agricultural Experiment Station have shown that there is an abundance of native reeds and grasses in this area that are palatable and nutritious for cattle and will produce gains comparable to the pastures in other sections of this country. Then too, there is an abundance of other feed in eastern North Carolina, so that cattle can be finished for market within the same area in which they are produced; and these cattle are within easy reach of the highest market in the United States: namely, the vicinity of New York City.

The lush pastures on the mountain slopes in western North Carolina will undoubtedly continue to produce thousands of feeder steers each year, and, since more concentrated fertilizers are being manufactured and good roads have made it possible to haul this material into the area, these pastures will be gradually improved.

Included in the 1935 report of 684,266 cattle of all ages were 385,000 dairy cows, which is an increase of about 85,000 during the previous five years. Those farmers who are engaged in dairying have found it profitable and there are many large herds of dairy cattle in the State that compare favorably with any in the nation.

The majority of the dairy cows kept in North Carolina are for the production of fluid milk which is consumed daily by the population of the State; however, throughout the rural sections of the Piedmont and the mountains there were manufactured 2,500,000 pounds of creamery butter in 1935. It is estimated that 26,000,000 pounds of farm butter was made during 1935 by the farmers of North Carolina. Approximately 30,000,000 gallons of whole fluid milk was produced and sold in bottles throughout the State during this same year. Of this amount, 10,000,000 gallons was pasteurized.

The mountain sections of North Carolina are well adapted for the production of cheese. During the past year 482,000 pounds of Cheddar Cheese was manufactured in the co-operative plants.

There were reported on January 1, 1935, 362,104 horses and mules of all ages. Of this number 18.4 per cent were horses. This is a decrease of 18,445 from the figures for April 1, 1930. This represents an average of 16.9 acres in crops per horse or mule. For the nation as a whole, 71.1 per cent of the total were horses, and there were 23.2 acres per horse or mule.

Many farmers of North Carolina have found that it is more satisfactory to produce their work stock than to make replacements by purchase. The State's recent farm program has encouraged the production of more work stock, and as a result of these recommendations a large number of good breeding animals for the production of both horses and mules have been placed among our farmers.

North Carolina produced 327,881 pounds of wool in 1934, shorn from 69,687 animals. On January 1, 1935, there were 77,044 sheep and lambs reported on farms. North Carolina ranks in 33rd place in wool production, and 34th in numbers of sheep and lambs.

Our mountain counties have the climate, soil and grass that are well suited for sheep production. Farmers can always find sale for wool at good prices to our local woolen mills. North Carolina is noted for the manufacture of wool blankets which are sold in all parts of the world.

Early lamb production is especially profitable to those farmers engaged in this specialized business.

North Carolina reported 26,743 goats and kids of all ages, valued at \$40,115. During 1934, 722 pounds of mohair was clipped, the State ranking 28th. Texas, Arizona, New Mexico, and Oregon produce nearly 95 per cent of the total national production.

On January 1, 1935, there were 947,143 swine of all ages reported in North Carolina, valued at \$6,535,287, as compared with 838,994 swine valued at \$7,325,446 in 1930. A significant increase is also to be noted in the number of sows and gilts to farrow, as on January 1, 1935, this number was reported as 108,143, while on April 1, 1930, it was only 68,988. North Carolina moved from 16th place to 14th place in number of swine in this period, although the number of hogs per farm reporting was still only half the national average.

The eastern North Carolina farmer can get more for his corn crop by feeding it to pigs than by any method so far found. The great difficulty is that the feeder pigs are not available. Those farmers who keep sows so as to produce enough pigs to consume their corn crop have found it most profitable. Our nearby markets furnish a ready sale for all classes of livestock and their products.

Chickens on farms in North Carolina numbered 8,806,000 on January 1, 1935. During the calendar year 1934, the production of chicken eggs produced was over 35,000,000 dozens, and over 16,000,000 chickens were raised. The three leading counties in number of chickens on hand were Johnston, Union, and Robeson.

On the same date, January 1, 1935, there were 90,708 turkeys over three months old. Ashe County, reporting 8,560, had more than twice the number of any other county. Other leading counties were Alleghany, Chatham, and Duplin.

FEDERAL AGRICULTURAL PROGRAMS

The annual gross income of North Carolina farmers more than doubled during the 1932-1935 period, rising from \$150,081,000 to \$305,122,000. Although complete figures for 1936 are not as yet available, indications are that they will compare favorably with or exceed those of 1935.

But the improvement of agricultural conditions and rural life cannot be measured in terms of money alone. As farmers got back on their feet financially, they were encouraged to balance their farming programs, become more self-sufficient, conserve and build up their soil, raise their standard of living, and take more interest in a better home and community life.

Agricultural conditions in 1936 are in strong contrast with those prevailing in 1932 and the early part of 1933, when the prices of farm commodities were so low that few farmers could meet their obligations. With five-cent cotton and ten-cent tobacco, many were losing their homes; others were on the verge of ruin.

The upward trend in prices started in the latter part of 1933 with the inauguration of the AAA crop adjustment programs. First there was the cotton plow-up campaign in the summer, with farmers agreeing to limit their production also in 1934 to keep from glutting the markets with price-depressing surpluses. When the tobacco markets opened in the fall, prices were so disastrously low that the Governor of the State called for a marketing holiday. While sales were suspended, an agreement was reached whereby the buyers would raise their prices if the growers would pledge themselves to regulate production the next year.

As the AAA program got under way, farmers were offered benefit payments for adjusting their cotton, tobacco, wheat, corn, and peanut acreages and for limiting their hog production. As production was brought more nearly into line with consumption, prices began to rise and as prices rose, farm income increased.

On a basis of 78 crop and 13 livestock items, plus AAA benefit payments, North Carolina's gross farm income during the 1932-1935 period was as follows:

In 1932: crops, \$104,456,000; livestock, \$45,625,000; no AAA payments.
In 1933: crops, \$182,760,000; livestock, \$44,445,000; AAA payments, \$6,741,000.
In 1934: crops, \$226,101,000; livestock, \$55,660,000; AAA payments, \$17,314,000.
In 1935: crops, \$226,118,000; livestock, \$66,711,000; AAA payments, \$12,293,000.

The total gross income for each of the four years was as follows: 1932—\$150,081,000; 1933—\$233,946,000; 1934—\$299,075,000; 1935—\$305,122,000.

Gross income means the income from cash sales plus the value of products consumed in the household on the farm where they were produced. Cash receipts came primarily, but not entirely, from the sale of cotton and tobacco. The combined acreage of these two crops in 1935 was materially less than in 1932, but the cultivated acreage of all farm land in 1935 was much greater than in 1932.

As cotton and tobacco acreage was decreased, the acreage of grain, legumes, hay, and pasture was expanded. The greater amount of feed produced, and the rising prices of livestock, led to more livestock production. There were 51,000 more milk cows in North Carolina on January 1, 1936, than on January 1, 1932. The number of other cattle increased by 26,000 head. The number of swine increased by 12,000 head.

The increase in cattle and hogs along with the increased production of grain and other crops for home consumption has reduced the cost of operating farms and has helped to raise the standard of living.

The AAA crop adjustment programs, like the present soil-improvement program, were administered as co-operative projects of the U. S. Department of Agriculture and the State College Agricultural Extension Service. In the different counties, county agents, their assistants, and local committees composed of farmers handled local details of the work.

During the 1933-1936 period, North Carolina farmers have learned more about the value of co-operation than they had in the entire previous history of the State. They found concrete proof that when practically all farmers work together, with the aid of their government, they can maintain a reasonable measure of control over their own industry, and thereby regulate production to market demands.

And as they took land out of cash crops, they were urged to put it into soil-conserving or building crops and crops for home consumption. This encouraged balanced farming and it paved the way for the present soil-improvement program which is making farmers more "soil conscious" than ever before.

During the life of the AAA crop adjustment programs, 416,894 contracts were signed by North Carolina farmers to adjust their cotton, tobacco, wheat, peanut, corn, and hog production. This year, around 140,000 farmers have signed work sheets for participation in the AAA soil-improvement program. Under the old programs, each farmer had to have a separate contract for each commodity. Under the present plan, each work sheet covers all farming operations on a given farm.

When first established, the original AAA was intended primarily to adjust the production of certain cash crops to protect farmers from ruinously low prices. Later, it encouraged the planting of conserving crops and food and feed crops for home consumption on land taken out of these cash crops. The soil-improvement program provides payments for diverting land from any depleting crop to a soil-conserving or building crop, and for carrying out practices that improve and protect the land.

For years farmers had been neglecting and abusing their land. Many of them grew, year after year, row crops that exhausted the soil fertility and hastened erosion. In places, rains washed from each acre tons of top-soil every year. Yields per acre decreased where the soil was robbed of its fertility. Fields and farms were abandoned as they became gullied and run-down.

In connection with the soil-improvement program, designed to reclaim, build up and conserve farm land, the State College Extension Service is also carrying on its program to encourage balanced farming, better utilization of the land, better livestock production, and a more fruitful and satisfying rural life. There is hardly an aspect of farm life in North Carolina that is not reached by the work of the extension service. It even has made arrangements with the North Carolina School for the Deaf to use interpreters in carrying the program to the deaf farmers.

Administering the AAA programs threw a tremendous burden on the Agricultural Extension Service, but at the same time these programs have made the farmers more acutely conscious of the work the Service is doing for them, and more calls are being made upon it than ever before. There is only one county in the State without the services of a farm demonstration agent.

In 1932 there were 45 administrative officers and extension specialists, of which three were engaged in work with negroes, and 96 white farm and assistant agents, 60 white home demonstration agents, 19 colored farm agents, and 10 colored home demonstration agents.

This year the Extension Service has 54 specialists and administrative officers, with five in charge of negro work, 174 white county and assistant farm agents, 93 white home agents and assistants, 29 colored farm agents, and 12 colored home agents.

Directly in charge of AAA soil-improvement work in the State are four men under whom works an office staff that has varied in size from 50 to 150 workers, according to the amount of clerical work to be done from time to time.

In 1935, the county farm and home agents worked a total of 24,504 days in their offices, and spent a total of 40,303 days in the field carrying the extension program to 195,727 of the State's 300,000 farm families. In compiling the list of farm families reached, the Extension Service counted only those families which adopted better methods of farming and home-making as a direct result of Extension activities.

During the year, the agents received in their offices 1,194,298 farmers and others interested in the work, and gave out information by means of 237,468 telephone calls. Six days a week, every week in the year, this meant an average of 38 personal visitors and 7.6 telephone calls per day in each county.

Although financial conditions of the past few years permitted only limited State appropriations for agricultural extension work in North Carolina, the Extension Service in this State has done remarkably well with the funds available. Here the State appropriations for extension work during the past biennium amounted to 95 cents for each farm in the State. The U. S. average for all states is \$1.69 per farm. Yet the percentage of North Carolina farms on which better practices have been adopted as a result of extension activities is 52.6 per cent, as compared with the U. S. average of 43.6 per cent. In this State, 65 per cent of the farm families were reached; the U. S. average is 55.9 per cent.

In addition to the aid offered to farmers through crop adjustment and soil improvement programs, financed by the Federal Government and carried out largely through the co-operation of State agencies, many other efforts were made to relieve the effect of the depression on agricultural activities. Brief statements of some of these efforts follow.

FEDERAL LAND BANK

From May 1, 1933 to June 30, 1936, this bank made 5,056 loans in a total amount of \$11,741,100. All counties were represented in these loans, the highest number of loans being made in Robeson County, with 197, others being Johnston with 194, Sampson with 146, Rowan and Cleveland with 145 each, and Nash and Pitt counties with 137 each.

The Land Bank Commissioner, in the same period, made 12,905 loans in a total amount of \$17,221,271. The total loans from these two agencies therefore amounted to \$28,962,371, the largest totals being Robeson with \$1,136,642, Johnston with \$1,009,807, Wake with \$825,588, and Northampton with \$795,348.

PRODUCTION CREDIT ASSOCIATION

The Production Credit Associations operating in some twenty-eight cities made a total of 46,054 loans in a total amount of \$12,562,243. The largest amount handled was that in Rocky Mount, serving Edgecombe, Nash and Wilson counties, with loans amounting to \$808,443, the next being Raleigh, serving Wake County with 2,748 loans in the amount of \$755,017.

CROP AND FEED LOANS

From January 1, 1933 through September 30, 1936, farmers of North Carolina availed themselves of opportunities for negotiating loans for crop production and feed

necessities, in a total amount of \$10,827,587. This sum was divided among 124,549 loans at an average of \$86.92 per loan. All counties participated, the largest number of loans being made in Surry County.

RENTAL AND BENEFIT PAYMENTS

In connection with the Agricultural Adjustment Administration, the following total benefit and rental payments were made through June 30, 1936.

Cotton	\$14,571,738.70
Wheat	160,774.49
Tobacco	15,648,958.15
Corn-Hogs	1,061,334.27
Peanuts	985,296.02
<hr/>	
Total	\$32,428,101.63

RURAL REHABILITATION

During the fiscal year July 1, 1935 to June 30, 1936, the Resettlement Administration had approved of loans and made committments to advance \$2,272,895 in loans and grants to 17,049 clients in North Carolina. Of this total amount, actual payments had been made of \$1,854,773, and grant payments of \$233,349 completed.

Under the Farm Debt Adjustment activities, 909 cases were under consideration and 306 cases reduced in the aggregate amount of \$290,183, or approximately 25 per cent of the original indebtedness.

CHAPTER VII

FOREST RESOURCES OF NORTH CAROLINA

The forest regions of North Carolina fall readily into three broad divisions: Southern Forest, Central Hardwoods, and Northern Forest. Although the conventional division follows the established physical regions of the State, namely, Coastal Plain, Piedmont and Mountain regions, respectively, there exists overlapping of one forest belt into another to form extensive transition areas.

SOUTHERN FOREST

Of the three regions, the Southern belt is the most extensive, comprising approximately 50 per cent of the total land area of the State. This region includes the entire Coastal Plain, and with extensions into the Piedmont, is estimated at 15,000,000 acres. Of this total acreage, some 80 per cent, or 12,000,000 acres remain in forest growth.

The dominant commercial species are second-growth longleaf and loblolly pine. Gum, cypress, and oak occur extensively in the hardwood bottoms of this area.

CENTRAL HARDWOODS

The Central Hardwood belt is the Piedmont Plateau of North Carolina, forming the transition ground between the Southern Forest region of the Coastal Plain and the prevailing hardwood area of the mountains. Comprising 36 per cent of the total land area, the Central Hardwood region contains over 11,000,000 acres. Forty per cent of the area, or approximately 4,500,000 acres, may be classified as forest lands. No extensive tracts, such as those found in the coastal and mountain sections, occur in this area, forest growth being confined almost entirely to farm woodland.

The principal commercial species are red and white oaks, hickory, yellow poplar, and second-growth shortleaf and Virginia pine.

NORTHERN FOREST

Although the Northern Forest region is small compared with the other forest belts of the State, the value of commercial wood production is almost equal to that of the Southern Forest region. Approximately 5,000,000 acres in extent, these forest lands include over 700,000 acres belonging to the Pisgah and Nantahala National Forests.

These mountain, or northern, forests are characterized by their great variety of species, nearly fifty different trees being recognized as having commercial worth. It is possible to classify all species, however, into four major groups: spruce forests, at elevations of over 4,500; moist-slope and cove forests, from about 2,000 to 4,000 feet; dry-slope and ridge forests, occupying like elevations, but in dry soil; and the plateau forests below 2,500 feet. Of these, the dry-slope and ridge forest type is the most extensive, containing chestnut, oak, black oak, scarlet oak, pitch-pine, and locust.

Near extinction of the chestnut has been brought about by the chestnut blight. Total loss of this enormous timber resource has been avoided by cutting trees affected soon after the attack of the blight. Salvaged within a reasonable length of time, the wood and bark are usable commercially.

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The place of the chestnut will, in time, be taken by the associated species. Studies made by the Appalachian Forest Experiment Station indicate that of these, the chestnut oak will prove the most important.

The following table presents the divisions of forest lands in North Carolina, by regions.

TABLE XXIX
FOREST REGIONS

	Southern	Central Hardwood	Northern	Total All Regions
Total Forest Lands.....	11,806,751	4,345,857	4,757,026	†*20,909,634
Farm Woodland.....	4,532,486	2,728,267	2,226,134	9,486,887
Pasture.....	517,201	548,649	589,837	1,655,687
Not Pasture.....	4,015,285	2,179,618	1,676,297	7,871,200
National Forest Lands.....	112,966	23,054	720,920	†856,940
All other Woodlands.....	7,161,299	1,594,536	1,769,972	10,525,807

*In addition to lands listed above, includes forested lands of State and National Parks, Game Refuges, and of Resettlement Administration areas. Excludes Highways, railroads, towns, marsh, sand dunes, and cultivated lands.

†Net Acres acquired and approved for purchase, as of June 30, 1936.

Based upon data supplied by the Forestry Division, North Carolina Department of Conservation and Development, the following tabulation gives the principal merchantable species in standing board feet, by forest region. The measure is M Board Feet.

TABLE XXX
PRINCIPAL MERCHANTABLE SPECIES IN STANDING BOARD FEET—BY
FOREST REGIONS IN M BD. FT.

Species	Southern Forest	Central Forest	Northern Forest	Total
Pine.....	3,742,200	1,196,850	873,552	5,812,602
Oak.....	98,500	292,560	1,998,613	2,289,673
Poplar.....			436,386	436,386
Chestnut.....		163,340	241,822	405,162
Gum.....	1,003,000			1,003,000
Cypress.....	163,250			163,250
Mixed.....	641,650	1,652,550	1,065,487	3,359,687
GRAND TOTAL, 13,469,760.				

FARM WOODLANDS

Farm woodlands represent 45 per cent of the total forest lands in North Carolina. The per cent of farm woodlands, by forest regions, is as follows: Southern Forest, 38 per cent; Central Hardwoods, 62 per cent; and Northern Forest, 47 per cent.

That farm woodland is a valuable asset productive of income in money is becoming recognized generally in North Carolina. As a result, farmers are now giving more attention to their wooded acres than ever before in the history of the State. In many sections, and particularly in the better farming areas of the Piedmont region, permanent woodlands to give a sustained yield through the years are recognized as an essential part of a well-equipped farm.

The 1930 Census reported 8,326,434 acres of farm woodland in the State in 1929. As noted in Table XXIX, farm woodland in North Carolina amounted to 9,486,887 in 1934, an increase of 1,160,453 acres over 1929. This increase in the total acreage, however, has not materially affected the 1934 average woodland per farm, given as 30 acres, because of the increase in the number of farms in 1934 over the previous census report.

According to the United States Census of Agriculture for 1935, there were 1,247,515 acres of idle or fallow land in North Carolina in 1934, a report covering only 120,212 of the total 300,967 farms in the State. This fallow land was comprised of crop land in cultivated summer fallow, or land on which crops were planted for soil improvement or the prevention of soil erosion. With all farms reporting, the total acreage would doubtless be in excess of two million idle acres. A considerable portion of this acreage should and, in all probability, will be given over to producing farm woodlands.

In addition to this fallow land, there was a vast acreage of land classified as crop failure, and for which reforestation appears the only course to return the acres to production and economic worth.

Herein lies the attractive phase of growing trees upon the farm. Trees are, as a rule, grown on the less fertile, stony, thin, or poorly drained soils, and on steep slopes. The chief economic reason for timber growing on the farm is to get a money return from those portions which would otherwise be unproductive.

Although comparatively new, forest management on farm woodland is already paying considerable dividends to the landowner, as well as adding materially to the State's supply of timber.

Crossties, poles and piles, fence posts, pulpwood, and fuel wood are the chief timber products cut on North Carolina farms.

The latest available figures on Farm Woodland Forest Products are those of the peak year, 1929.

Item	No. Farms Reporting	Production
Saw and Veneer Logs	12,696	425,520 M Board Feet
Firewood	187,519	2,638,271 Cords
Pulpwood	4,445	104,083 Cords
Fence Posts	7,752	794,817 Number
Railroad Ties	4,547	579,056 Number
Poles and Piles	1,811	147,529 Number

The total value of all forest products cut on farms, for home use and for sale, amounted to over \$15,000,000 in 1929. The average annual value of forest products from woodlands is around \$12,000,000.

NATIONAL FORESTS

First considered as protection for major watersheds, the National Forests, in their rapid expansion, have been responsible for assumption by the Forest Service of full responsibility for the land and all the natural resources contained thereon. Therefore, in addition to preserving valuable tracts of timber established as National Forests, this new program includes the purchase and reforestation of denuded acres. Forest management, including special measures to improve timber stands, to prevent and control fire and disease, and to establish a sustained yield of the resource—these are all a definite part of the forestry program in the National Forests today.

A wildlife program and the development of recreational facilities have only recently been added to the extensive work of the U. S. Forest Service. In a word, the National Forests have developed from a single use to a full policy of multiple land use in this country.

Following the original purpose of the National Forest, that of guarding watersheds, the first and most extensive areas were set up by the Federal Government in the Mountain region of North Carolina. A definite change in policy, however, is shown in the fact that, although some two and one-half million acres constitute the total purchase units in the mountains, only a small portion of which has been approved for purchase, extensive purchase units representing over 800,000 acres have been set up in the Piedmont and Coastal Plain sections of the State. These later purchases were made possible by the General Assembly in 1929, through an amendment to the act authorizing the Federal Government to acquire lands in North Carolina for National Forest purposes.

The total expenditures of the Federal Government for acquiring 575,771 acres of land in the State, reported as of June 30, 1936, amounted to \$2,992,427, or an average price of \$5.20 an acre.

The table on the following page presents information as to purchase units within which lands are being acquired, data as of June 30, 1936.

PISGAH NATIONAL FOREST

Established in 1914, the Pisgah National Forest is one of the most valuable of the entire Appalachian group. Composed of the Grandfather, French Broad, Mt. Mitchell, and Pisgah divisions, this National Forest by readjustment proclamations of 1936 now lies wholly within the State of North Carolina.

The timberlands of the Pisgah National Forest when acquired, were generally in a low state of productivity as a result of repeated fires, and the removal of all timber by lumbering operations from accessible areas—the latter accomplished with little regard to protection of the young growth. The timber remaining intact from fire and damage through improper cutting was inaccessible to market because of lack of roads, and consequently was not being utilized.

TABLE XXXI
 INFORMATION BY FOREST AND COUNTY AS OF JUNE 30, 1936, AS TO PURCHASE
 UNITS WITHIN WHICH LANDS ARE BEING ACQUIRED

(Compiled from Data supplied by U. S. Forest Service)

Forest—County	Purchase Unit	Watershed	Total Acres in County	Net Acres approved for purchase	Acquired acres
PISGAH—					
Ashe	Cherokee	New	327	327	.....
Avery	Pisgah	Santee-Tenn.	122,300	21,311	20,583
Buncombe	Pisgah	Tennessee	70,800	31,463	30,364
Burke	Pisgah	Santee	66,700	43,980	18,330
Caldwell	Pisgah	Catawba	84,500	47,521	46,128
Caldwell	Yadkin	Yadkin	34,592	.....	.....
Haywood	Pisgah	Tennessee	186,200	60,667	37,135
Henderson	Pisgah	Tennessee	27,800	18,635	18,635
McDowell	Pisgah	Tennessee	127,700	50,997	49,291
Madison	Pisgah	Little Tennessee	163,800	43,056	25,822
Mitchell	Pisgah	Tennessee	82,800	8,807	.....
Transylvania	Pisgah	Tennessee	109,400	74,821	62,661
Watauga	Pisgah	Santee-Tennessee	37,600	393	393
Watauga	Yadkin	Yadkin	30,856	.....	.....
Wilkes	Yadkin	Yadkin	129,048	.....	.....
Yancey	Pisgah	Tennessee	108,400	28,930	22,036
Total . . . . .	.....	.....	1,372,823	430,908	331,178
NANTAHALA—					
Cherokee	Nantahala	Tennessee	287,600	48,891	23,392
Clay	Nantahala	Tennessee	101,900	38,113	20,838
Graham	Nantahala	Little Tennessee	191,700	38,406	163
Jackson	Nantahala	Tennessee	287,100	15,769	7,180
Macon	Nantahala	Little Tennessee	337,800	143,159	124,447
Swain	Nantahala	Little Tennessee	96,800	5,674	2,628
Transylvania	Nantahala	Savannah	46,100	.....	.....
Total . . . . .	.....	.....	1,349,000	290,012	178,648
UHARIE—					
Davidson	Uharie	Pee Dee	12,000	304	100
Montgomery	Uharie	Pee Dee	263,300	16,462	100
Moore	Uharie	Pee Dee-Cape Fear	171,000	.....	.....
Randolph	Uharie	Pee Dee-Cape Fear	113,700	6,288	104
Total . . . . .	.....	.....	560,000	23,054	304
CROATAN—					
Carteret	Croatan	Neuse-Atlantic Coast	109,200	48,953	31,676
Craven	Croatan	Neuse	125,300	37,500	19,224
Jones	Croatan	Neuse	71,800	26,513	14,541
Total . . . . .	.....	.....	306,300	112,966	65,441
GRAND TOTAL . . . . .	.....	.....	3,588,123	856,940	575,771

Although the process has been a gradual one, the unsatisfactory condition of much of this property has been remedied by modern methods of fire control, better logging practices, and by construction of better roads to make available for market mature and over-mature timber heretofore inaccessible.

In addition to improving forest conditions, the conservation and proper management of the land in the Pisgah National Forest have brought about an increase in the value of the property.

Standing merchantable timber, by species and counties, in the Pisgah and Uharie National Forests, for 1936 is shown in Table XXXII.

The Pisgah National Forest Supervisor reports the following timber for sale, measurements in M Board Feet.

County	Chestnut Available	Average Annual Volume All Other Species
Avery	455	725
Buncombe	9,254	1,500
Burke	518	75
Caldwell	500	100
Haywood	1,823	397
Henderson	625	2,177
McDowell	71	164
Madison	2,968	184
Mitchell	7,401	770
Transylvania	5,000	1,152
Watauga		
Yancey		

All chestnut on National Forest lands, dead or alive, standing or down, is available for purchase at all times. In addition to the above amounts, such products as posts, crossties, acidwood, pulpwood, tanbark, and fuel wood are available on nearly all National Forest lands.

Timber and products taken from Pisgah National Forest lands in the fiscal year 1936, are reported as follows:

Sawtimber, M Board Feet	7,106 (all species)
Chestnut Acidwood, long cords	5,126
Pulpwood, long cords	164
Fuelwood, short cords	79
Poles, number	184
Crossties, number	770
Posts, number	1,152
Tanbark, long tons	397
Shrubs, number	2,177

NANTAHALA NATIONAL FOREST

Only slightly lower than the mountain region containing the Pisgah National Forest, the mountain section in which the Nantahala National Forest is located produces similar species of forest trees. Following the readjustment of National Forest lands in 1936, this forest contained a total of 290,012 acres, all lying within North Carolina.

The first purchases of land for the new National Forest were made in the year 1913. Immediately, reforestation, stand improvement, forest management, and adequate fire and

disease control measures were instituted. As a result, marked improvements have been made over the entire area. Both timber and land have shown a most satisfactory increase in value, raising the total worth of the Nantahala Forest region to an important place in the Appalachian forests.

Timber cut and sold from the Nantahala National Forest in 1935 is reported as follows:

Sawtimber, M Board Feet	338
Chestnut Acidwood, cords	4,622
Chestnut Poles, number	177
Crossties, number	7,606
Pulpwood, cords	971
Bolts, M Board Feet	28
Posts, number	100
W. O. Staves, number	25,301
Fuelwood, cords	40
Poles, number	1,946
Hemlock Bark, tons	184

The total returns to the Forest from the above sales was \$5,702.75.

At the present time, management plans are being made for the Nantahala National Forest, but some time will be required before they are complete. It is estimated that, upon completion of these plans, about 10 per cent of the standing merchantable timber, or approximately 23,857 thousand board feet, will be for sale.

There follows a table giving the standing timber on lands of the Nantahala National Forest.

TABLE XXXIII

STANDING TIMBER ON LANDS OF NANTAHALA NATIONAL FOREST;
BY SPECIES AND COUNTY. VOLUME IN M BOARD FEET

(Compiled from data supplied by Nantahala National Forest)

Species	Per Cent of Total	Cherokee	Clay	Graham	Jackson	Macon	Swain	Total
Chestnut	10	1,078	3,609	679	498	17,716	378	23,958
Poplar	5	539	1,805	339	249	8,857	189	11,978
Oak	30	3,233	10,827	2,036	1,494	53,147	1,134	71,871
Basswood, Birch, Maple, Ash, Cherry.	5	539	1,805	339	249	8,857	189	11,978
Hemlock	20	2,155	7,218	1,357	996	35,431	756	47,913
Yellow Pine	10	1,078	3,609	679	498	17,716	378	23,958
White Pine	1	108	361	68	50	1,772	38	2,397
Others	19	2,047	6,857	1,289	946	33,660	719	45,518
Totals	100	10,777	36,091	6,786	4,980	177,156	3,781	239,598

Grand Total M. B. M. Nantahala National Forest—239,571.

UHARIE AND CROATAN NATIONAL FORESTS

The Uharie and Croatan National Forests were originally purchase units in the Pisgah and Sumter Forests, respectively. Although administration of these areas was maintained in 1936 by the aforementioned established forests, the two units were created separate National Forests in July of 1936.

The Uharie Forest had an area approved for purchase of 23,054 acres, with only 304 acres actually acquired in 1936. Land acquisition has gone forward very slowly in this area.

The dominant forest types of the Uharie are hardwoods, principally oak and hickory. Shortleaf and loblolly pine are also found. The species are typical, to a large extent, of those found at lower levels in the western North Carolina mountains.

Land acquisition has gone forward more rapidly in the Croatan area, comprising sections of Carteret, Craven, and Jones counties. Up to June 1, 1936, the area approved for purchase was 112,966 acres, 65,441 acres of which had been acquired.

This coastal forest includes lands which have been cut and burned over repeatedly, and occasional plantations of second growth loblolly, longleaf, and savanna pine. The hardwoods of the swamp lands are almost entirely exhausted, as far as commercial production is concerned.

The major portion of work in the Croatan National Forest will consist of reforestation, particularly with longleaf pine, and protection from fire. Such measures as those now designed for this region will undoubtedly return to timber production extensive tracts of lands in this section of the State. The forestry practices here will prove an excellent example for owners of private timber tracts.

The existence of the four National Forests in North Carolina, tracts upon which only mature timber is cut and forest management is practiced, gives promise of a definite, continued supply of timber from these regions.

PRIVATE FORESTS

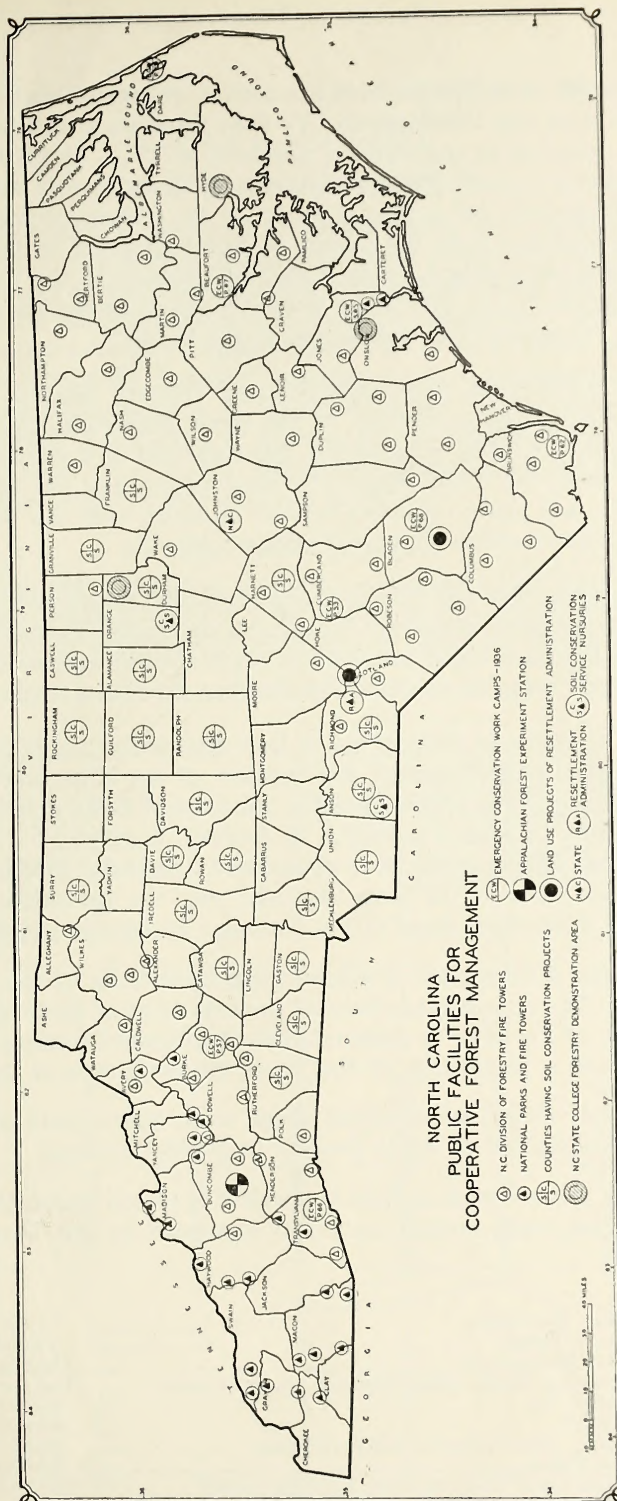
Private forest lands in North Carolina are represented by extensive holdings of private individuals, large lumber companies, and pulp manufacturers. These holdings constitute the major portion of lands classified as "All other Woodlands", in Table XXIX.

The chief problem facing the owners of private forests is that of maintaining adequate control and suppression of fire. The State, through the Division of Forestry, has set up a fire control organization which co-operates with counties and with associations of individuals, whose combined holdings amount to not less than 30,000 acres. A more complete explanation of this Forest Fire Control Organization is contained in a later section of the chapter.

All private timber tracts located within counties co-operating with the State in Forest Fire Control, receive the benefit of this State protection. Additional protection is sometimes secured, as has been indicated, through protective associations operated in connection with the State Division of Forestry. In counties that do not co-operate, landowners may secure special protection under a form of co-operative agreement.

Although active management of timber is rarely practiced by private landowners, of recent years there has been a trend in this direction. The examples set by the National Forests, the State Division of Forestry, and some private landowners, in this respect have had considerable weight in bringing to the attention of other private timber holders the possibilities of securing a sustained yield on their lands.

PLATE XVI



For many years State Forests have been advocated for North Carolina by the Department of Conservation and Development. To date, progress in this line has been limited to an enabling act, enacted by the General Assembly of 1915. In 1929, an acquisition policy was adopted, looking toward the establishment of State forests and parks. This latter measure was "To provide for a Special Study of the Forest, Cut-over, Open and Shore Lands of North Carolina with the Object of Recommending to the Next Regular Session of the General Assembly a Public Policy of Looking to the Selection and Ultimate Acquisition of Areas Which Should be State Owned or Controlled for the Production of Timber and the Permanent Use and Benefit of the Public."

The State Park Program has recently moved forward rapidly, three parks having been established since the enactment of the above legislation. The Forest Program, as far as any acquisition of land is concerned, has remained at a standstill. Under provision of the act, however, the Department of Conservation and Development, through its Forestry Division, has made extensive studies of lands with the "object of determining their location, condition, ownership, and present value."

While expressing only the long-time policy of the Department, this act has placed on record one of the most important features of the State's Forestry Program. Although no appropriation has been made available to carry out this law, opportunities for making studies of individual areas have, from time to time, presented themselves.

The matter of proposed Federal aid in land acquisition is still pending. In connection with the Submarginal Land Program, and because of its importance in inaugurating a State Forestry Program for North Carolina, an excerpt from a letter written by Chief Forester F. A. Silcox to State Forester J. S. Holmes, is given: "... in the policy of the SRC (Surplus Relief Corporation), it is understood informally that long-time lease agreements may be made whereby the State can take over the protection and administration of approved areas other than those within National Forests or purchase units."

Acquisition and development of submarginal farm lands by the Federal Government continued in 1936. The approximate date of the beginning of State management, whether the State Division of Forestry is designated the administering agency, and the conditions attendant upon such a disposition of the lands, are not known at this time.

Should these developed submarginal areas come under State control, it will doubtless mean the inauguration of State Forests in North Carolina.

The following areas, which include lands already placed under option by the Resettlement Administration, were several years ago suggested by the Department as suitable for public forests:

Cedar Mountain	55,000 acres
Mount Tirzah	90,000 acres
South Mountains	135,000 acres
Drowning Creek (Resettlement Administration)	130,000 acres
Bentonville	90,000 acres
Rockfish	80,000 acres
Bladen (Resettlement Administration)	80,000 acres
Fort Fisher	30,000 acres
Phelps Lake (Resettlement Administration)	220,000 acres

FORESTRY ACTIVITIES OF VARIOUS AGENCIES OPERATING IN NORTH CAROLINA

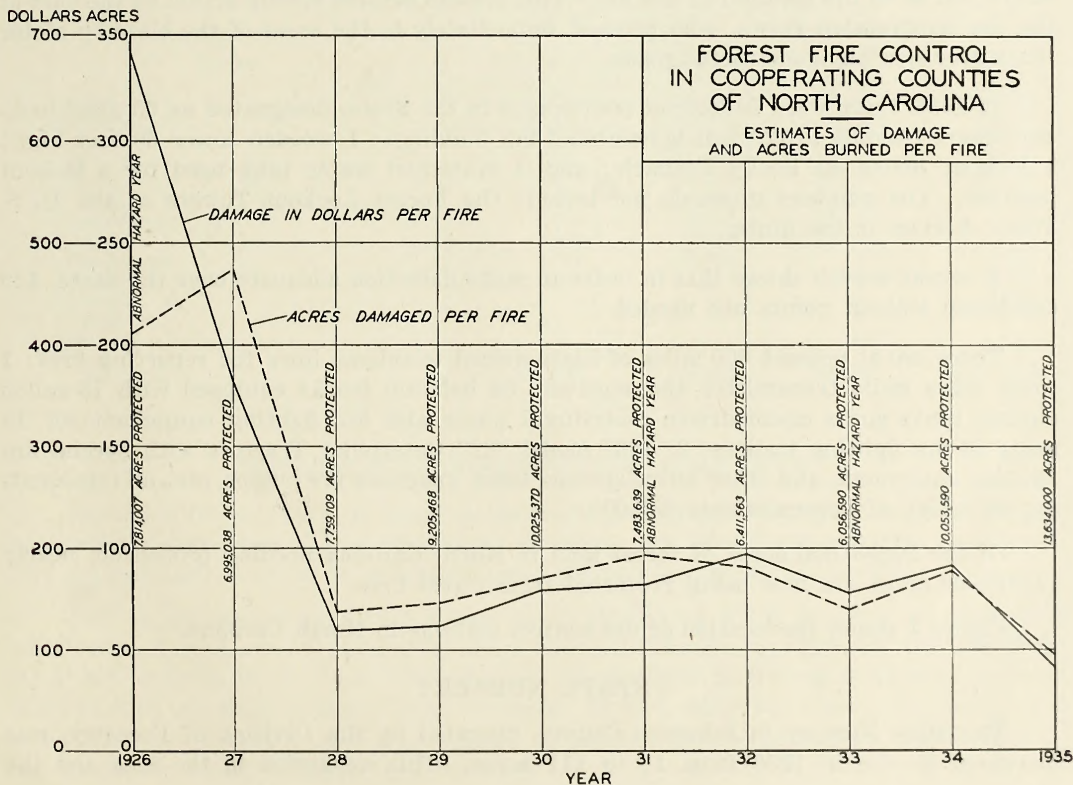
DIVISION OF FORESTRY

The Division of Forestry, Department of Conservation and Development, concerns itself basically with forest fire control work, a program carried on through co-operation with the U. S. Department of Agriculture under the Clark-McNairy law. The Division acts as supervising agency for some phases of the National Emergency Conservation Work Program now in progress in North Carolina, co-operates in an advisory capacity with the Soil Erosion Service and with the Forestry Program of the Resettlement Administration, directs the work of the State Nursery in Johnston County, carries on an educational program through distribution of materials to schools, acts as administering agency for State Parks, and carries out such other routine and miscellaneous activities as are incident to the administration of general forestry work in the State.

FOREST FIRE CONTROL

The State, through the Division of Forestry, co-operates with counties in which the timbered area warrants establishment of a forest fire control organization. Prior to 1935, co-operation on the part of counties was voluntary, or optional. The General Assembly of

FIGURE 7



1935, however, enacted into law legislation whereby the State could require co-operation from counties having large timbered areas and high forest fire hazards.

Under a written agreement, the co-operating county will reimburse the State for one-half the expenditures made within the county for the actual cost of fire protection and suppression, up to a stipulated maximum amount. The county's appropriation is matched by an equal amount of the State and Federal funds. The basis for the county's share of cost is usually figured at one-half cent per acre for the forested lands within the county, which, when matched by an equal amount from the State and Federal governments, represents a total annual cost of one cent per acre for fire prevention and suppression.

In counties having extensive timberlands where added protection is needed, the State encourages the establishment of Protective Associations by groups of individual landowners. Co-operation is extended on an acreage basis and the rates paid depend upon the fire problem involved. Costs range from one to three cents per acre.

The "eyes" of the Forest Service are the lookout towers placed at vantage points in co-operating counties throughout the State. During the main fire seasons, which usually run from October to the middle of December, and from February to June, these towers are manned by lookouts and a crew of from three to five men. The lookout, upon spotting a fire, locates its exact position by the use of special maps and an azimuth circle. The warden in charge of the area is notified by telephone, direct from the tower, and the crew instructed as to the position of the fire. This system assures speedy action on the part of the fire suppression crews, who proceed immediately to the scene of the blaze by motor truck over specially constructed roads.

In 1936, there were 70 lookout points used in the State, designated as 63 steel lookout towers from 35 to 120 feet in height; 4 tall buildings; 1 wooden tower 60 feet high; 1 lookout house on Rocky Pinnacle; and 1 municipal water tank used for a lookout position. The numbers given do not include the Forest Lookout Towers of the U. S. Forest Service in the State.

A recent survey shows that in order to make detection adequate over the State, 120 additional lookout points are needed.

There are at present 600 miles of State-owned telephone lines for reporting fires; 1 short wave radio transmitter and receiver; 35 half-ton trucks equipped with 75-gallon storage tanks and a motor-driven centrifugal pump and fire fighting equipment for 10 men; 58 fire fighting trailers; 2 1935 model "22" Caterpillar Tractors with special fire fighting equipment, and other miscellaneous tools, knapsack fire pumps, etc., all representing an outlay of approximately \$50,000.

Of the 20,000,000 acres of forest land in North Carolina needing protection, nearly 14,000,000 acres are now being protected from forest fires.

Figure 7 shows the location of fire control stations in North Carolina.

STATE NURSERY

The State Nursery in Johnston County, operated by the Division of Forestry, was increased in size in 1936 from 15 to 111 acres. This expansion in the area and the

development of further facilities for producing seedlings, are designed to enlarge the capacity of the nursery to meet the increased demands for seedlings made by the various Federal agencies operating in the State, which have reforestation as a part of their works. The addition of 96 acres of land is expected to increase production in the next several years from three to ten million seedlings per year.

Following the depression, there has been a marked increase in the requests for seedlings from private landowners who desire to reforest sections of their land. With the reductions in cultivated areas made under the new soil conservation program, it is expected that demands upon the nursery by farmers and other individual landowners will be materially increased.

It is the definite objective of the nursery to encourage private reforestation, and to furnish, as nearly as it is possible to do so, an ample number of seedlings, at cost, to aid in carrying out this objective.

Distribution of forest tree seedlings, by species, for the bienniums from 1932 to 1936, are given in the table following:

TABLE XXXIV
DISTRIBUTION OF TREE SEEDLINGS BY SPECIES
1932 - 1936

Species	1932-33	1933-34	1934-35	1935-36
1. Loblolly Pine	93,006	258,392	392,175	2,065,900
2. Shortleaf Pine	56,381	61,202	28,725	45,850
3. Longleaf Pine	19,790	24,152	57,325	471,913
4. Slash Pine	11,331	31,152	30	34,300
5. Black Locust	25,400	34,652	510,107	296,065
6. Tulip Poplar	22,700	4,621	3,216	118,175
7. Black Walnut	8,846	9,445	10,906	9,035
8. Red Gum	2,450	6,952		
9. Miscellaneous	2,578	5,040	5,985	1,417
10. Mimosa			4,315	17,650
11. Maritime				11,050
12. Cypress				2,110
13. Ash			5,650	
Totals	242,482	435,608	1,018,444	3,073,465

EMERGENCY CONSERVATION WORK (ECW)

The three major types of work assigned the Emergency Conservation Work Camps in North Carolina were, "To help protect, develop, and perpetuate existing forests; to help prevent soil erosion, to establish new, and to reestablish old forests."

This assignment brought about the establishment of ECW projects in connection with works of the State Division of Forestry, the Soil Conservation Service, the establishment of the Great Smoky Mountains National Park, the U. S. Biological Survey, National Forests, and the Resettlement Administration. In fact, wherever a project called for the protection, development, and perpetuation of forests and the prevention of soil erosion, the services of the ECW have been engaged.

The direction of all ECW camps have been under the direction of the U. S. Forest Service, while the establishment of projects and actual supervision of work on all projects, other than those upon Federal lands, have been carried out by the State Division of Forestry.

The following table shows the vast amount of work done in North Carolina by the ECW, since its inception in 1933:

TABLE XXXV
EMERGENCY CONSERVATION CAMPS — ACTIVITIES, 1933-1936

	Total
Projects	
Forest Fires	
Man days	31,212
Truck Trails, miles	1,097.3
Fire Breaks, miles	177.8
Fire Towers, number	55.6
Telephone Lines, miles	399.7
State Nursery	2,450
Man days	
Seed Coll.	
Pine, Bu. (cones)	3,396
Poplar, Bu. (seeds)	150
Trees Planted, acres	15,168
Grass Planted, acres *	104,468
Brush Paving, square yards *	22,790
Timber Estimating, acres	11,533
Surveys, miles	56
Dams built	6,258
Wells, Waterholes	91
Trailer sheds	27
Other Buildings	221
Bridges built	664
Stand Improv., acres	5,535
Other man days *	15,647

The Forestry Department of the Soil Conservation Service, U. S. Department of Agriculture, was installed in the Deep River Project area on May 1, 1934. The initial work of this Department followed the general objective of the Soil Conservation Service, that of determining the amount of soil erosion, establishing methods and practices to stop erosion, and the development of the proper land use to be established in each area upon which work should be done. The Soil Conservation and its Forestry Department have maintained close co-operation with the North Carolina Department of Conservation and Development, the U. S. Forest Service, the Federal relief agencies engaged in forestry work, local organizations, and with the individual landowners upon whose acres work has been carried on. All Soil Conservation Service forestry activities have been carried out in accordance with the policies approved by the State Forester, who is a member of the State Soil Conservation Advisory Council.

A resume of accomplishments from July 1, 1935 to June 30, 1936, follows.

The eight demonstration projects and twenty ECW camps collected and transferred the following tree and shrub seed to the nursery division: 6,072 bushels of conifers; 48,356 pounds of hardwood seeds; and 38,731 pounds of shrub seeds. This collection represents 48 species of trees and shrubs, over 470,000 cuttings and some 50,000 plants which were collected and either transferred to the nursery division or used directly in the work.

A total of 4,488,355 trees and shrubs were planted on 587 farms during the fiscal year. The area planted consisted of 497 acres of cultivated land, 252 acres of pasture land, 2,256 acres of idle land, and 569 acres of gullied area—a total of 3,575 acres planted. Woodland improvement demonstration plots were established, covering a total of 2,756 acres on 431 farms. Seeding, planting and general gully control work extended over 1,593 acres.

In addition to these works, the Soil Conservation Service has co-operated in the establishment of nurseries and in the development of others already existing. These nurseries include the City Lake Nursery at High Point, the State Nursery of the State Division of Forestry, nurseries in Orange and Anson counties, the Hoffman Nursery of the Resettlement Administration, and the Friendship Nursery.

If the present number of operating CCC camps and the eight project demonstration areas continue, it is proposed that the Soil Conservation Service will sign up for general improvement, some 800,000 acres of farm lands. Of this total acreage, 22,000 acres will be retired to new forests, a work which will require between 28 and 30 million plants with 120 thousand man days required to plant them.

Some six to eight million acres of forest land in 35 counties are within the range of present camps and projects where fire protection is needed. Only nine of these counties have organized fire protection agencies. As a vital part of erosion control work and water conservation, the woodland management section must play a prominent role in a fire control program in co-operation with the State.

Woodland management plans have been drawn up for a number of selected farms. These plans will include an inventory of the amount of material available by products, the farmer's needs, and an estimate of any surplus material for sale. Recommendations will be made as to proper management practices, intermediate cuttings, and disposal of surplus products.

Educational work of the Soil Conservation Service will become increasingly important. Measures to expand this part of the program to include illustrated talks and lectures for groups of students, farmers, 4-H Clubs, etc., have been taken.

FOREST OWNED AND OPERATED BY THE FORESTRY DEPARTMENT OF STATE COLLEGE

The Forestry Department of State College owns and operates 87,000 acres of forest land. These areas are used for the purpose of studies in timber growth and forest development. These classes do the technical work such as determining weight of growth, density of stand, the mixture of species, and the silviculture practices to be used on the forest. These areas are located in different parts of the State which furnishes the conditions for studying the different types. One of the forests containing 1,500 acres is located in Durham county, another area of 1,500 acres is located in Hyde county, and a large tract of 84,000 in Jones and Onslow counties. The forestry work carried on during the summer school period is centered on these forest areas. The mills operating on the forest tract furnish very fine opportunity for the classes to study defects in timber and the application of various log rules, volume tables and other practices in forest administration. The policy is to carry on these forests as a business operation, all the charges to be derived

from the sale of forest products. In this way students take part in a forest business. The total timber stand on the school forest contains about 50 million feet of merchantable timber and a very good stocking of young stands. The largest amount of the merchantable timber is on the forest in Jones and Onslow counties.

RESETTLEMENT ADMINISTRATION

The Resettlement Administration is engaged in the acquisition of approximately 100,000 acres of submarginal land in Richmond, Moore, Scotland, Hoke, and Bladen counties. As these acres are acquired, purchases being made from the owners of the land, the Administration through its Land Use Program, establishes definite projects of reforestation, restocking of wildlife resources, construction of recreational facilities, and the development of other permissible facilities looking toward a full, multiple use of the land.

The Rural Resettlement Division of the Administration is engaged in purchasing good farming land in other sections of the State, which may be bought through long time government loans by the farmers who sell their submarginal lands and desire to move and make a new start on better soil.

The Hoffman area, the larger of the Land Use Projects, comprises some 60,000 acres and extends into submarginal sections of Moore, Scotland, and Hoke counties. Approximately 32,000 acres, or over half the entire area, have been set aside for reforestation and forest stand improvement. To facilitate forestry work in this, as well as in the Elizabethtown area, there is already in operation a large locust and pine seedling nursery near Hoffman. Producing at full capacity, this nursery will be capable of growing 20 million seedlings for planting on these submarginal lands. Construction of eighty miles of truck trails and fire lanes to aid in fire suppression and control, is underway.

The Elizabethtown area lies wholly within Bladen County and consists of approximately 40,000 acres. Reforestation will be carried out upon 16,000 acres, as seedlings are made available by the Hoffman Nursery. Improvement work upon this project has resulted in the construction of 42 miles of truck trails.

Combining the acres under development as forest lands, 48,000 acres are contained in both Land Use Projects. Upon completion of the present development of these forest lands, it is expected that the administration of the areas will be turned over to the North Carolina Department of Conservation and Development.

These forests will be made to serve a dual purpose. In addition to producing timber, they will enhance the value of the land for wildlife and recreation—two other important phases of development in the areas.

WOOD-USING INDUSTRIES OF NORTH CAROLINA

There are 25 or more different types of industries in North Carolina whose principal raw material is supplied by the forests. Excluding the sawmills and furniture establishments, there were 393 wood-using industries in the State in 1933. These plants gave employment to 12,260 wage earners, paid \$4,873,281 in wages, spent \$9,396,731 for materials, and turned out products valued at \$20,250,544.

TABLE XXXVI

TIMBER CUT YEARLY FOR COMMODITY USE FROM COMMERCIAL FORESTS OF NORTH CAROLINA,
BY COMMODITIES

Items	Commodities Produced						Timber Cut				
	Quantity			Total			Saw Timber Equivalent			*Cordwood	
	Unit	Total	Soft-wood	Hard-wood	Total	Soft-wood	Total	Soft-wood	Hard-wood	Total	Hard-wood
		Thou-sands	Thou-sands	Thou-sands	cu. ft.	Thou-sands	cu. ft.	Thou-sands	ft. b. m.	Cords	Cords
Lumber.....	Ft.b.m.	1,395,000	1,110,000	285,000	286,334	214,228	72,106	1,395,000	285,000	1,860,262	489,731
Fuelwood.....	4,300	3,010	1,290	301,502	212,032	89,470	226,014	656,791	450,777	1,860,531	489,731
Hewed ties.....	Pieces	575	57	518	7,313	602	6,711	21,220	2,121	19,099	19,099
Fence posts.....	Pieces	22,000	15,400	6,600	48,044	33,816	14,228	107,096	82,095	24,101	85,561
Pulpwood.....	Cords	190	115	75	20,771	12,807	7,964	62,807	30,564	32,243	3,583
Mine timbers (round).....	cu.ft.	79,729	2,397	77,332	22,076	555	21,521	87,940	2,876	85,064	85,064
Veneer logs.....	Ft.l.s.	69,632	27,130	42,502	10,613	3,440	7,173	46,173	17,820	28,353	28,353
Slack cooperage stock.....	Pieces	3,836	1,444	2,392	7,960	2,605	5,355	34,663	13,495	21,168	21,168
Staves.....	Sets	8,579	660	7,919	2,357	153	2,204	9,503	792	8,711	8,711
Logs and bolt in manufacture.....	Ft.l.s.	23,710	23,710	342	324	279	324	1,283	1,283	1,103	1,103
Tight cooperage stock.....	Pieces	350	6	342	45	45	45	180	180	180	180
Shingles.....	Sets	126	92	34	521	521	95	2,371	2,371	376	376
Export logs and hewn timbers.....	Pieces	126	92	34	97	2	95	386	10	376	376
Poles.....	Pieces	126	92	34	1,396	1,128	268	5,907	5,085	822	822
Distillation wood.....	Cords	19	14	5	57	57	57	150	150	300	300
Piling.....	Cords	117	117	117	388	269	119	1,900	1,400	500	500
Tanning extract wood.....	Cords	117	117	117	11,771	351	11,771	53,100	53,100	17,700	17,700
Excelsior wood.....	Cords	117	117	117	351	351	351	1,125	1,125	750	750
Total.....					713,915	479,961	235,954	2,452,752	1,688,086	2,204,441	596,785

Forest Service, 1932, with cooperation by the Bureau of the Census. A proportional estimate by softwoods and hardwoods, relative to the quantities shown in the regional table for South Atlantic and East Gulf. The basic figures for pulpwood are estimates based on information supplied by the Appalachian Forest Experiment Station. Estimates based on the period 1925-1929. Quantities are cut, not consumption or requirements.

*From trees of less than sawtimber, on sawtimber and cordwood areas. †Extensions under timber cut include those for hoops.

In order to present a more accurate picture of the timber cut in North Carolina each year to supply the demand of all wood-using industries for raw material, it has been thought advisable to choose an average year to be selected from the period 1925-1929, rather than a later period unduly affected by the depression.

SAWMILLS

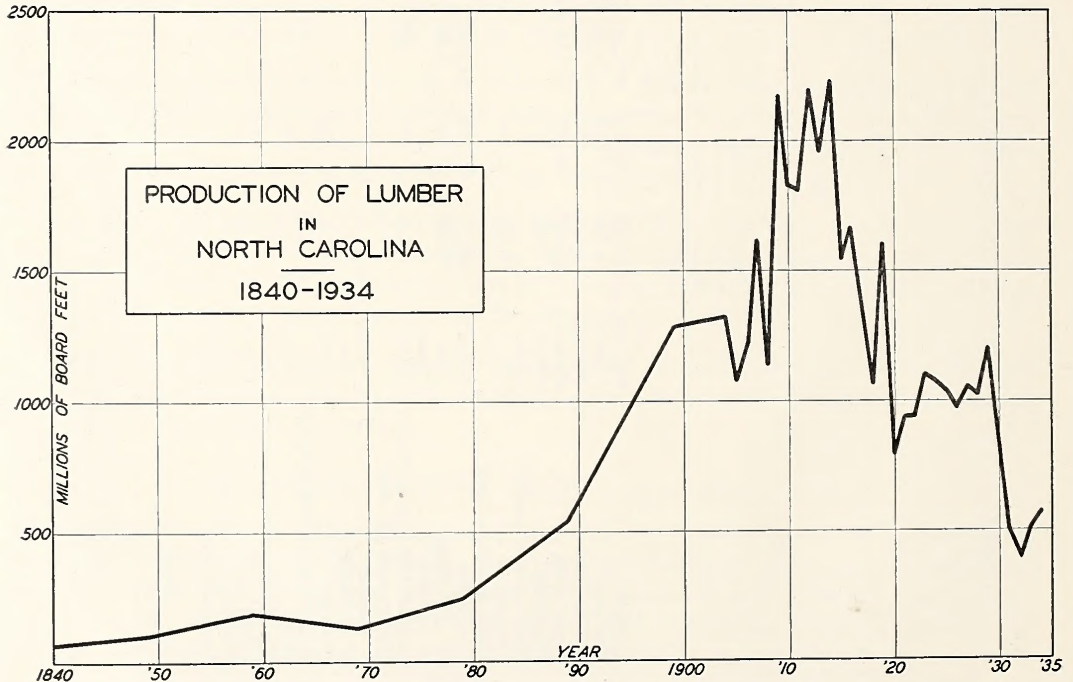
The operation of sawmills is classified as a primary wood-using industry. Two general classes of sawmills operate in North Carolina, the small portable type which may be moved from place to place, and the stationary band sawmills. The average cut per day for the portable sawmill runs around eight thousand feet, while the larger stationary mills are capable of cutting from seventy-five to a hundred thousand feet of lumber in a day's operation.

An average of twelve hundred sawmills of all types have operated in North Carolina since 1899. The peak year was 1909, when 3,307 mills were engaged in producing lumber. The year 1932 is low, only 575 sawmills being operated in the State. In 1934, 1,154 sawmills were reported, cutting a total of 571,452 M Board feet.

Sawmills give employment annually to some 15,000 persons, the salaries and wages amounting to over \$12,000,000. These mills spend annually over ten million dollars for logs and other raw materials, fuel and power, and cut lumber valued at nearly \$40,000,000.

The entire lumber industry in North Carolina was more active during the summer of 1936 than in any similar period since 1930. Mills in the Southern Forest region of the State are reporting anywhere from 15 to 33 per cent increase in business as compared

FIGURE 8



with last year. Hardwood manufacturers are reporting the best business in years, due to increased demands for furniture lumber, oak flooring, and greatly accelerated orders for railroad equipment.

Recommended steps to improve the competitive position of the lumber industry as reported by the special Lumber Survey's Committee to the Department of Commerce, are as follows: improvement of product in manufacture, fireproofing and other research; small house design and prefabrication; and extensions of publicity and sales helps to establish the advantages of wood use and of research in improved design and scientific adaptation to more extended industrial use.

Figure 8 illustrates fluctuations of lumber production in North Carolina from 1839 to 1934.

PLANING MILLS

The manufactured products belonging to this industry include flooring, siding, ceiling, partition, exterior house trim, and also products of general millwork. Ninety-one such mills, excluding those connected with sawmills, operated in North Carolina in 1933, turning out products valued at over \$4,000,000. The industry gave employment to 1,724 persons whose wages for the year amounted to \$862,461. Cost of materials, fuel, and purchased electric energy for operating, amounted to nearly \$2,934,000.

Well over 100,000,000 board feet of wood cut from the forests of North Carolina is demanded annually by the planing mills in the State. Practically all species of wood are utilized, with pine heading the list.

In addition to the wood cut from the forests of this State, the planing mills have steadily increased their consumption of wood from other states. It is estimated that from 20 to 30 million board feet of wood are imported by this industry each year.

BOXES AND CRATES

In the manufacture of boxes and crates, pine is the principal wood used. The box factories turn out various kinds of products—complete boxes and crates of thick veneer, nailed boxes, and knocked-down boxes, commonly referred to as box shooks.

In 1933, thirteen establishments were in operation, employing 610 persons at wages amounting to \$252,408 and producing boxes and crates valued at \$1,117,752. The cost of materials, fuel and purchased electric energy amounted to \$697,502.

Undoubtedly, this industry has suffered heavy losses due to the substitution of cardboard and fibre boxes for shipping, and because of the fact that the poorer stock used in the manufacture of boxes has reduced considerably the margin of profit.

The industry uses approximately one hundred million board feet of lumber annually, with from three to six million board feet being imported from outside the State.

COOPERAGE

The 1933 census figures report 17 cooperage establishments in North Carolina, employing 163 wage earners who receive \$59,748 in wages. The manufactured products

were valued at \$346,211. A considerable boost has been given this industry by the repeal of the Eighteenth Amendment. It is estimated that in 1936, establishments and production have nearly doubled the 1933 report.

In addition to producing barrels for shipping potatoes and apples and hogsheads for storing and aging tobacco, the cooperage plants have added the manufacture of kegs for beer, wine, and bourbon.

BASKETS

There were eleven factories producing baskets in 1933. This industry employed 715 persons, paid \$228,157 in wages, and manufactured products valued at \$854,440. The total cost of materials, fuel and purchased electric energy amounted to \$350,854.

The baskets manufactured are used in tobacco warehouses, for packing and shipping fruits, berries, and vegetables. A considerable industry in handweaving with rattan and willow has sprung up in the mountains of western North Carolina. These ornamental baskets have a large sale to the tourist trade.

AGRICULTURAL IMPLEMENTS

From eleven factories in 1929 to five reporting in 1933, indicates a serious drop in this industry. However, this condition has been somewhat remedied in 1936, due to the improved buying power of local markets which consume almost the entire production.

Products manufactured include hoes, cotton and corn planters, small grain drills, fertilizer distributors, peanut harvesters, and grain and pea threshers. The total value of these products in 1933, was \$305,068. Wages paid to 105 persons amounted to \$74,098. Cost of materials, fuel, and purchased electric energy was \$86,178.

VEHICLE AND VEHICLE PARTS

In former years, this was one of North Carolina's main industries. The era of good roads and automobiles, however, has brought about great changes. In 1933, only three establishments were in operation in the State, manufacturing carriages, wagons, and sleds. These factories employed 119 persons, paid \$64,900 in wages, and manufactured products valued at \$344,434. The cost of materials, fuel, and purchased electric energy amounted to \$193,246.

WOOD TURNING AND SHAPING

Products manufactured by this group include numerous small articles, such as bobbins, spools, and shuttle blocks used in textile mills; all types of bungs, handles, vehicle parts, novelties, and many other pieces.

The number of plants classified under this group for 1933, was 14 establishments. These factories employed 257 persons, paid \$117,293 in wages, and manufactured products valued at \$538,180. The cost of materials, fuel and purchased electric energy was \$240,870.

Hand carved wood novelties are sold widely to tourists throughout the western North Carolina mountains.

COFFINS AND CASKETS

The manufacture of burial cases in North Carolina was carried on in 1933 by eight establishments. The total value of all caskets, coffins, burial cases and other morticians' goods amounted to \$806,223. Employment was given to 190 persons, the wages amounting to \$134,127. Cost of materials, fuel and purchased electric energy was \$329,723.

The principal woods used by this industry are chestnut, pine, oak, cypress, and gum. Wood, such as mahogany and walnut for the finer cases, is imported by this industry.

OTHER WOOD-USING INDUSTRIES

There are some 230 other establishments classified as Other Wood-Using Industries. The products manufactured include brooms, brushes, toys, novelties, excelsior, cedar chests, turpentine and rosin, rayon, and numerous other products. The total value of products manufactured by these industries is nearly eleven million dollars. Over eight thousand persons are employed annually, receiving wages in excess of \$3,000,000.

NAVAL STORES

Production of Naval stores in North Carolina, ante-dating the lumber industry, reached its maximum production in the decade from 1870 to 1880. Although the State has continued production, practical exhaustion of the longleaf pine forests in the early present century has forced virtual abandonment of the industry. The unquestioned leadership that was once North Carolina's has passed further South and to the Southwest.

The following table shows the extent of the decline of Naval Stores in the State.

TABLE XXXVII

TURPENTINE AND ROSIN OUTPUT BY STATES — 1935-1936

State	Gum Rosin 500-Lb. Barrels	Gum Turpentine 50-Gal. Barrels
Georgia	909,407	275,450
Florida	466,929	141,416
Alabama	160,450	45,637
South Carolina	53,716	16,697
Mississippi	32,271	10,045
Louisiana	15,311	4,733
Texas	5,657	2,066
North Carolina	3,259	956

Considering the great importance of the industry and the many uses to which its chief products, turpentine and rosin, may be put—it is highly desirable that production of naval stores should be restored in North Carolina. The present supply of gum producing trees, entirely second growth, will be added to materially when the extensive tracts of young longleaf pine forests now developing in the Southern Forest region begin producing.

Adequate fire control, reforestation—both by natural and artificial means, improved methods in scaling trees for gum, preserving and distillation advancements are all conducive to renewed activity in the Naval Stores industry. Vast opportunities exist in North Carolina for putting large acreage under management for a permanent yield of these valuable products.

POSSIBILITIES FOR FURTHER DEVELOPMENT OF FOREST RESOURCES IN STATE

The abundance of timber, the rapidity of its growth and the steadily increasing value of its by-products, coupled with sound measures for elimination of destructive cutting and fire, perpetuation of supply and conservation of lumber, make North Carolina an ideal State for the development of lumber, paper, and many other wood-using industries.

In view of the fact that the trend in this State is definitely toward a sustained yield of timber from the forest, it may be stated that lumber manufacturing in North Carolina is a stable industry. In all probability, the amount of timber grown and cut for the lumber industry will continue to lead, by far, wood used for any other product. However, that the expansion of related industries will be enormous in the South and in North Carolina, is a certainty.

The development of the pulp and paper industry is reaching such proportions as to create a revolution in the industry. The basis for the regional shift to the South is the enormous supply of cheap wood available.

North Carolina's supply of wood available for pulp manufacture is in excess of 66,000,000 cords. In the Southern Forest area alone, that region occupying the Coastal Plain of the State, over 43,000,000 cords of pulpwood are available. Under proper forest management, it is estimated that the vast pine growing region in this section of the State could produce up to 1½ cords of wood per acre per year. Considering the fact that the Nation's entire annual pulpwood requirements are now only about 12,000,000 cords, the immensity of North Carolina's supply and the possibilities for its utilization become apparent.

In addition to the enormous supply of wood available for pulp and paper manufacture, the fact that North Carolina is able to provide unsurpassed competitive price advantages, should have considerable weight in influencing paper manufacturers to set up plants in this State.

The cellulose industry, taking its chief raw materials direct from the forests, is invading the field formerly occupied solely in the South by cotton. Production of rayon from southern pine is an outstanding example, expanding steadily in this and other parts of the South while most manufacturing lines were engaged in retrenching during the depression. Granting the contention that further inroads will be made upon cotton consumption for producing textiles and allied products, the South will still control the situation, for in this region there exist forest resources without parallel in the whole world.

North Carolina, as one of the leading timber producing states of the South, occupies a most fortunate place in respect to further developments in the cellulose industry.

Production of chemicals from wood goes back to the early Naval Stores Industry when tar, turpentine, and rosin formed the chief products. In recent years, experiments by chemical engineers promise to open up a great new field for production of chemicals from wood. In this field, North Carolina offers splendid opportunities for the hardwood distillation industry.

This industry is based upon production of charcoal, methanol, and acetic acid. It is estimated that a cord of wood yields 48 bushels of charcoal, 815 gallons of pure methanol, and 114 pounds of acetic acid. Charcoal produced in distillation is used for fuel in households and institutions, dining car grills, hotels, restaurants, and in connection with picnic grounds and camping sites. Great possibilities exist for briquetting of charcoal for use as fuel in better homes. Further uses of charcoal are: a reagent in a number of chemical industries, a constituent of black powder, of stock and poultry feed, in the manufacture of carbon products, and recently, as a deodorizing and decolorizing agent in the treatment of municipal water supplies.

The rich hardwood areas contained in the Piedmont and Mountain sections of North Carolina offer unlimited supplies of wood for wood distillation. Cull trees that have no other commercial use, woods waste cut to lessen fire hazards, and sawmill waste may be utilized by the industry and converted into valuable products.

Other possibilities for a greater utilization of North Carolina forests exist in commercial production of alcohol from wood, synthetic camphor from southern pine, and numerous other processes now in the experimental stage.

Smaller wood-using industries, now operating in the State but capable of expansion, are: manufacture of brooms, brushes, toys, novelties, cedar chests, refrigerators, show cases, shuttle blocks, bobbins, and the manufacture of bourbon, wine, and beer barrels, casks, and kegs.



CHAPTER VIII

MINERAL RESOURCES OF NORTH CAROLINA

The mineral resources of North Carolina have long been known to be widely distributed, of great variety, and many of them in very large quantities. Field studies have been carried on through the years until most of the mineral deposits of importance have been mapped. Extractive operations have been carried on for years, but the last decade has been marked by a phenomenal development of these resources.

As in many other states, mining operations have sometimes been subject to undue exploitation, and the discovery of larger deposits elsewhere or advances in technology have brought about an abandonment of some enterprises. Nevertheless, these same advances in science and industry have served to create new demands and open markets for minerals to be found in North Carolina. Minerals such as tin, nickel, manganese, titanium, and chromium, all to be found in North Carolina, are in greater demand, and this demand has given renewed impetus to prospecting, exploration, and development.

This chapter presents a review of the past development of mining activities in the State, a summary of the present status of the industry and suggestions of possibilities for future expansion.

HISTORICAL DEVELOPMENT

The earliest record of mineral resources is perhaps that of the Ralph Lane Colony, which in 1585 reported the discovery of iron ore at two places. These were probably limonite, or "bog iron" ores, and were described as being about "four score miles and six score miles from the fort." As far as the record indicates, however, no ore was produced until many years later.

Bar and pig iron was shipped to England in 1728, and hoes and kitchen utensils made by enterprising colonists from North Carolina goods competed with British products, in New York markets. The English Parliament in 1750 forbade "the establishment of rolling and splitting mills," in an effort to stop this competition.

Some contraband products were still produced along the Cape Fear, Yadkin, and Dan rivers, but the industry languished until the period immediately preceding the Revolutionary War. During that war, war supplies and pig iron were furnished to the American armies.

Gold was discovered accidentally in Cabarrus County, identification being made in 1802 from a specimen used as a doorstop. Placer gold was found in streams nearby and from this place to many other areas in the State. Incomplete records for gold production, from Treasury Department files, indicate active development, which reached its height in 1833. After the easy placer deposits were depleted, mining of weathered veins and finally of deeper deposits was carried on. The first vein opening was in 1825. The recovery of gold from the free milling ores, or sulphides, required greater expense for mining, crushing, and concentration. These increased costs reduced profits, and, with the discovery of gold in California, the industry ceased to be of any importance.

Copper was discovered by the gold prospectors in the early part of the nineteenth century. Emmons reports in 1852 that the Fentress Mine produced copper, after the gold deposit had been exhausted.

In 1820, Denison Olmstead, Professor of Natural History at the University of North Carolina and later the first State Geologist, reported the occurrence of coal in the Deep River section of Chatham County. This coal had doubtless been in use locally before 1800.

Clays suitable for making common brick were found widely and used in all the settlements. Talc and soapstone were used for building.

The War of 1812 brought about an increased demand for iron and other mineral products, supplying naval works as at Charleston, where cannon, anchors, and iron ship fittings were made. In 1850, there were two small iron plants in Gaston County. Another important plant was that of the American Iron and Steel Company, on the Cape Fear River in Harnett County. This plant utilized coal from the Deep River mines, while shells and limestone were shipped upstream to be used for fluxes. The product, consisting of pig iron, was shipped to Baltimore and used for the manufacture of car wheels.

The Cranberry Iron and Coal Company erected a fifteen-ton blast furnace at the Cranberry Mine in 1884, using charcoal and later coke from West Virginia for fuel. The North Carolina Steel and Iron Works also erected a blast furnace of 100 tons capacity at Greensboro in 1892. Both of these furnaces found it difficult to compete with the development of the industry in Pennsylvania and Alabama. The opening of the great ore deposits of the Lake Superior region marked the end of this industry in the State.

Lead and zinc mining was first started in Davidson County about 1900, and was continued at Silver Hill for several years, after the gold-producing surface deposits were exhausted.

Mica, early used for window panes, has been produced for years. Many new uses for sheet and scrap mica have been recently made, and means have been found to recover and use mica which was formerly discarded. Consequently this industry has prospered, and North Carolina is today the leading producer of mica in the United States.

Monazite, a phosphate of the cerium metals, usually containing quantities of thorium silicate, has been produced from surface deposits and in the weathered gneisses of North Carolina. Burke, Cleveland, Iredell, and Rutherford counties contained the more important deposits. The rare thorium and cerium salts were extracted from the minerals and used chiefly for the production of gas mantles. The production reached its peak in 1895 with 1,500,000 tons, which sold for prices ranging from \$7.00 to \$11.00 per ton. Discovery of larger deposits in India and Brazil, and the decrease in the use of gas for lighting, brought an end to the profitable production of these minerals.

Pyrite, zircon, corundum, and graphite have been mined in North Carolina in earlier years, but changes in manufacturing needs and processes have made their extraction no longer economical or feasible. Tin and nickel are now being mined in increasing quantities.

Mining operations respond very quickly to changes in demand, altered processes, and price levels. Gold mining in North Carolina illustrates this fact, since the increase in price of gold to \$35.00 per ounce has brought about a decided revival of interest and many operations are now being carried on. Industrial demands for minerals such as kyanite, vermiculite, barite, chromite, kaolin, manganese, are now increasing. Many

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PLATE XV
CHAPTER VII

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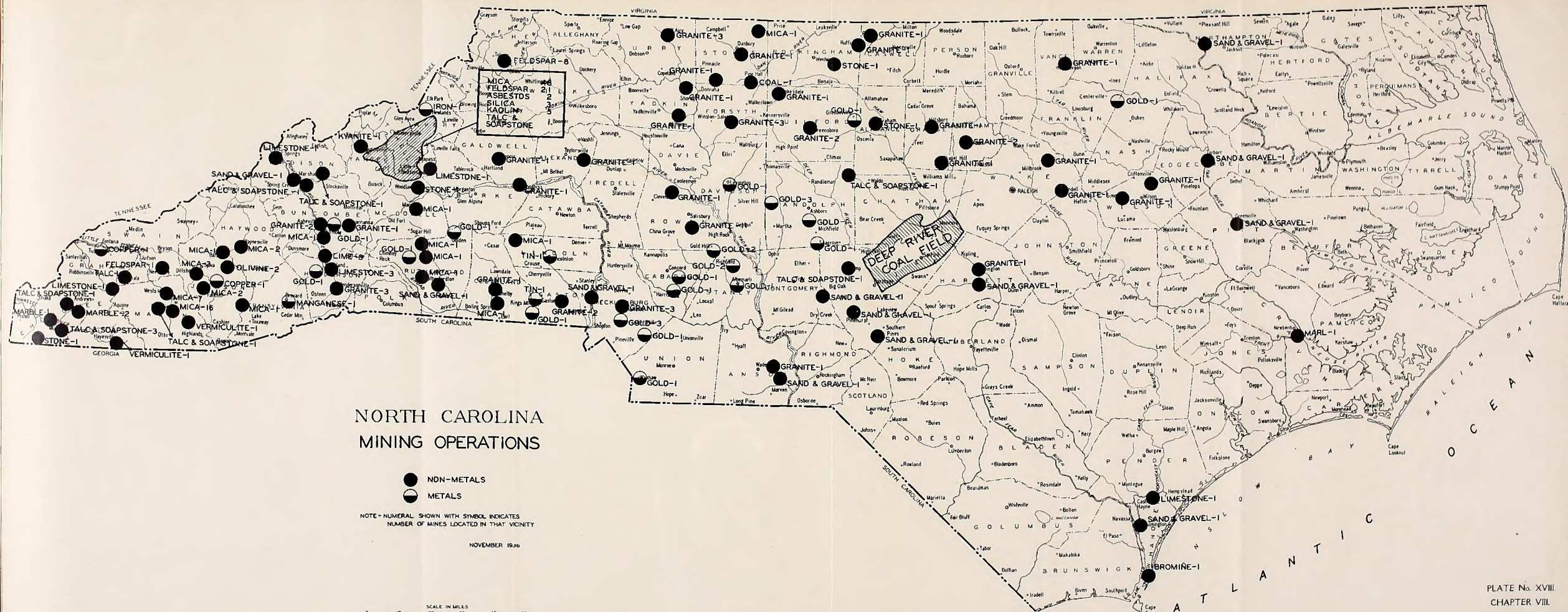
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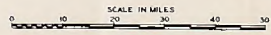


NORTH CAROLINA MINING OPERATIONS

- NON-METALS
- ◐ METALS

NOTE - NUMERAL SHOWN WITH SYMBOL INDICATES
NUMBER OF MINES LOCATED IN THAT VICINITY

NOVEMBER 1930



inquiries are now being received, and the mining industry is daily becoming more important in North Carolina.

MINERALS OF NORTH CAROLINA

The minerals known to be found in North Carolina are listed alphabetically in the following catalogue. Out of more than 300 minerals there are 70 that have at present a definite economic value. More than half of the valuable minerals are known to occur in commercial quantities.

Actinolite	Calamine	Emerald	Jasper
Aeschynite	Calcite	Emery	Jefferisite
Agate	Carnelian	Enstatite	
Aikinite	Cassiterite	Epidote	Kanmererite
Albite	Cerargyrite	Erinite	Kaolinite
Allanite	Cerolite	Essonite	Kerrite (2)
Alleghanyite	Cerussite	Euclase	Knebelite
Almandite	Chabazite	Euxenite	Kokscharoffite
Altaite	Chalcantite		
Alunite	Chalcedony	Feldspar (1)	Kreitonite
Alunogen	Chalcocite	Fergusonite	Labradorite
Amber	Chalcopyrite	Fibrolite	Lazulite
Amethyst	Chalcotrichite	Fuchsite	Lead
Amianthus	Chert	Fluorite	Leucopyrite
Amphibole (1)	Chlorite		Liebigite
Anatase	Chloritoid	Gadolinite	Limonite
Andesine	Chromite	Gahnite	Lucasite (2)
Andradite	Chrysocolla	Galaxite	Maconite
Anglesite	Chrysolite	Galena	Magnesite
Annerodite	Chrysotile	Garnet (1)	Magnetite
Anorthite	Chrysoprase	Garnierite	Malachite
Anthophyllite	Clarkeite	Gedrite	Marcasite
Antimony (1)	Clinocllore	Genthite	Margarite
Apatite	Coccolite	Glauconite	Margarodite
Aquamarine	Columbite	Gold	Marmolite
Aragonite	Copper	Goslarite	Martite
Arfvedsonite	Cordierite	Goethite	Meerschaum
Argentite	Corundophilite	Grammatite	Meionite
Arsenopyrite	Corundum	Graphite	Melaconite
Asbolite	Covellite	Grossularite	Melanterite
Auerlite (2)	Crocidolite	Grunerite	Menacconite
Augite	Crocoite	Gummite	Mengite
Automolite	Culsageeite (2)	Gymmite	Mica (1)
Autunite	Cummingtonite	Gymnite	Microcline
Azurite	Cuprite	Gypsum	Microcline
	Cuproscheelite		Microlite
Baltimorite	Cuprontungstite	Halite	Mitchellite (2)
Barnhardtite (2)	Cyanite	Halloysite	Molybdenite
Barite	Cyrtolite	Halotrichite	Molybdate
Basanite		Hatchettolite (2)	Monazite
Bastite	Damourite	Hausmannite	Montanite
Bauxite	Deweylite	Hematite	Montmorillinite
Bemenite	Diamond	Hereynite	Muscovite
Beryl	Diallage	Hiddenite (2)	
Biotite	Diaspore	Hornblende	Nagyagite
Bismite	Dichroite	Hielmite	Neotocite
Bismuthinite	Diopside	Hyalite	Niccolite
Bismutite	Disthene	Hydrofergusonite	Niter
Bornite	Dolomite	Hypersthene	
Boulangerite	Dudleyite	Ilmenite	Octahedrite
Braunite	Dufrenite		Oligoclase
Breunnerite		Indianite	Olivinite
Bronzite	Edenite	Iolite	Olivine
Brookite	Edwardsite	Iron	Orthoclase
			Orthite

Opal	Pyroxene	Sillimanite	Uranite
Ottrelite		Smaragdite	Uraninite
Paranthite	Quartz	Sperryllite	Uraconite
Paragonite	Flint	Spessartite	Uranophane
Pargasite	Milky quartz	Sphalerite	Uranotile
Pearl	Rock crystals	Sphene	Uranothallite
Penninite	Rose quartz	Spinel (1)	Uvarovite
Peridot		Spodumene	
Perofskite	Rensselaerite	Staurolite	Vanadinite
Pharmacosiderite	Rhodo-chrosite	Steatite	Vermiculite (1)
Phlogopite	Rhodolite (2)	Stibnite	Villarsite
Phosphocerite	Rhodonite	Stilbite	Vivianite
Phosphuranylite (2)	Rhaetizite	Stolzite	Voglite
Picotite	Ripidolite	Succinite	Wad
Picrolite	Rogersite (2)	Sulphur	Wavellite
Pitchblende	Rubellite		Wellsite
Platinum	Ruby	Talc	Willcoxite
Pleonaste	Ruby Spinel	Tantalite	Williamsite
Polycrase	Rutherfordite	Tenorite	Willemite
Prochlorite	Rutile	Tephroite	Wolframite
Proustite		Tetradymite	
Psilomelane	Sagenite	Tetrahedrite	Xanthitane
Pycnite	Samaraskite	Titanite	Xenotime
Pyrargyrite	Saponite	Tin	
Pyrite	Sapphire	Thorite	Zinc
Pyrochlore	Scheelite	Thulite	Zippeite
Pyroclussite	Schreibersite	Topaz	Zircon
Pyromelane	Scorodite	Torbernite	Zoisite
Pyromorphite	Sepiolite	Tourmaline	
Pyrope	Sericite	Tremolite	
Pyrophyllite	Serpentine	Troilite	
Pyrrhotite	Siderite	Tungstite	
	Silver	Turnerite	

(1) Group names

(2) First identified in North Carolina

These minerals may properly be classified in three groups: metals, non-metals, and gems. Detailed discussion of various representative minerals of these groups will be presented in the following pages. The presentation will follow the order of this outline:

Group I. Metals: gold, silver, copper, iron, manganese, tin, chromite, nickel.

Group II. Non-Metals: abrasives, asbestos, bromine, clays, coal, feldspar, kyanite, lithium minerals, marble, limestone, marl, mica, sand and gravel, stone, talc, pyrophyllite and soapstone, vermiculite (see mica).

Group III. Gems.

THE METALS

Gold and Silver

The establishment by Federal authorities of a price of \$35 per ounce for gold brought about a renewed production of that metal from North Carolina mines. Production has been recorded from six separate districts or belts in the past, and mines are operating in each at the present time. These belts as listed in Bulletin No. 38, *Gold Deposits in North Carolina*, issued by the State Department of Conservation and Development, are as follows:

1. The Eastern Carolina Belt: Franklin, Nash, Warren, and Halifax counties.

2. The Carolina Slate Belt: Extending from Person County on the north across the intervening counties to Anson and Union counties, thence into South Carolina.

3. The Carolina Igneous Belt: Paralleling the Slate Belt on the west, and varying from 15 to 35 miles in width.

4. The Kings Mountain Belt: Irregular in shape and extending roughly along the west side of the southern half of the Igneous Belt.

5. The South Mountain Belt: About 300 square miles in Burke, McDowell, and Rutherford counties.

6. The Western Belt: The area west of the Blue Ridge.

Except for some sedimentary limestones in the Kings Mountain Belt, the rocks in all belts are of igneous or metamorphic classification and are distributed in complex structures, the eroded remnants of past mountain-making eras.

The first two belts above are principally areas of schist and slate, cut in two or more planes by fissure veins filled with quartz. The quartz usually carries free gold or sulphides in the ore zones, though it may be barren. In places, sulphides are disseminated through the schists.

In the Igneous Belt, granites, intruded by diorites, gabbros and diabases, are the country rock, with the values lying in veins of quartz or sulphides, or both. The ore zones as a rule possess gneissic and schistose characteristics in this belt. Mecklenburg County, where some of the largest production of the State is found, lies in this region.

The Kings Mountain Belt contains as country rock crystalline schists and gneisses, with occasional lenticular bodies of siliceous materials, magnesium limestone and quartzite. The schists and gneisses are quite highly mineralized, especially where pegmatites have cut into them. The gold ores are found in quartz veins, mineralized zones, and in some of the limestone or quartzite lenses. Quartz with sulphides of iron, lead and copper are associated with the gold. Barite is not uncommon.

The South Mountain and the Western Belts are somewhat alike. Both have mica and hornblende gneisses and schists as the predominating country rocks, though in the former, lenticular structure is more readily discernible. Alteration products are common, and both areas have been cut by granite dikes. The gold values are from quartz stringers and veins. These are scattered and small in the South Mountain Belt and seldom bunched to permit mining on a large scale. Somewhat the same condition is found in the Western Belt, but, in addition, there are veins containing both copper and gold, the copper being the predominant metal and gold a valuable by-product. A great deal of the gold production of North Carolina in the past few years has come from copper mines.

In all of these belts there are found four types of placer deposits and saprolite, the latter term being given to the decomposed country rock which is still in place. These are classified further as:

1. Gravel beds along the streams and adjoining bottom lands.

2. Bench gravels on hillsides, deposited by stream action, but left well above the present stream level by later erosion.
3. Residual gravels in gulch and hillside accumulations.
4. The talus or accumulations at the base of steep slopes.
5. Saprolite, which is handled in mining with methods very similar to those used in placer operations.

In all of the above deposits the gold is free and is usually separated from the gravels by washing. The size of the metal particles ranges from dust to nuggets, and its high specific gravity causes it to be found somewhat concentrated and mixed with the heavier gravels. Gold in the saprolite retains the relative position that it had before the rock was decomposed.

Values in the placers vary from a few cents to many dollars a cubic yard. Such deposits tend to occur in pockets, and care must be exercised in their working.

In mining in the hard rock and occasionally in the saprolite, shafting and tunneling are used. Shafts are sunk beside the veins, and drifts or tunnels are sent out along the strike or directional trend of the ore bodies.

No mines in the State are operated solely for silver. All silver comes from the gold and copper ores as a valuable by-product. During 1935, the Treasury price for domestic newly mined silver was twice increased, the latest quotation being 77.57 cents per ounce.

Production of gold is shown in Tables XXXVIII and XXXIX. The records of the State Geologist show nineteen gold mines and nine recovery mills in active operation in eleven counties. Indications point to a much greater output for 1936 than for any year since 1915. A list of the active producers follows, arranged according to counties.

County	Name of Owner	Name of Mine	Location
Cabarrus	Claricy Consolidated Mine, Ltd., Toronto Can.	Whitney Gold Hill	Gold Hill
Cabarrus	Midas Mining Company, Winston-Salem, N. C.	Isenhour	Rocky River
Cleveland	Syndicate, Inc., Knoxville, Tenn.	Allen Furr	Kings Mountain
Davidson	Liberty Mining Corporation, Lexington N. C.	Patterson	Lexington
Franklin	Norlina Mining Company, Essex, N. C.	Liberty	Wood
Guilford	Gibson Gold Mining Co., Gibsonville, N. C.	Portis	Gibsonville
Henderson	Boylston Mining Co., Asheville, N. C.	Gibson	Forge Mt., nr. Hendersonville
Mecklenburg	Capps Gold Mine, Ltd., Charlotte, N. C.	Boylston	Charlotte
Mecklenburg	H. Jardine and Co., Charlotte, N. C.	Capps	Matthews
Mecklenburg	Stark Gold Mining Corp., Charlotte, N. C.	McCall, Dunn	Rozelle Ferry Rd., Charlotte
Mecklenburg	Rudisil Gold Mining Corp., Charlotte, N. C.	McCall	Charlotte
Randolph	Black Ankle Mining Corp., Seagrove, N. C.	Rudisil	Seagrove
Rowan	Gold Recovery Corp., Sanford, N. C.	Black Ankle	Gold Hill
Stanly	Crowell Mining Co., New London, N. C.	Gold Hill	New London
Stanly	N. C. Mining Corp., New London, N. C.	Crowell	New London
Stanly	Thompson Mining Co., Albemarle, N. C.	Parker	Albemarle
Union	Condor Consolidated Mines, Toronto, Can.	Thompson	Waxhaw
		Howie	

Copper

The copper-bearing areas of North Carolina roughly correspond to the gold belts of the western half of the State, and are four in number. The first is the Syenitic Belt,

and covers parts of Guilford, Rowan, Cabarrus, and Mecklenburg counties. Syenite, or granite, compose the country rocks and the ores chalcopryrite, malachite, and red copper oxide occur in veins. Gangue minerals are quartz with manganese, siderite, pyrite, and limonite. No mines are worked for copper in the district at present. The early production was from the decomposed surface deposits, and no record of quantity or value was kept.

The second area, that of the Central Huronian Slates, consists of highly metamorphosed, coarse and fine acid volcanics with either schistose or slaty appearance. Dikes and silicified zones are numerous, sometimes being small and parallel, giving a bedded appearance. The copper ore is auriferous chalcopryrite with pyrite.

The third area, the Virgilina District, extends through Granville and Person counties and into Virginia, and is on the east side of the Huronian Slate Belt. Greenstone schist and quartzzone sericitic schists have been intercalated with granitic masses and a smaller amount of gabbroid rocks. The veins, chiefly of quartz, with occasional pockets of epidote and calcite, vary from a few inches to fifteen or twenty feet in width and from a few hundred yards to five miles in length. Bornite is the principal ore with chalcopryrite and some chalcortite. No mines are operating in the North Carolina half of the district, but with a slight increase in the price of copper profitable operation could be resumed.

The fourth and last area is the Western or Mountain Belt, covering twelve counties. There are three subdivisions of this large area: the Swain County area, Ashe County area, and the Jackson-Haywood area. Swain County is the only county in the State now producing copper, and the whole output comes from the Fontana Copper Company of Fontana, North Carolina. The Cullowhee Mine, owned by the North Carolina Flux Company and located in Jackson County, is still capable of production and until 1930 was a steady producer.

Copper mining activity in North Carolina has naturally fluctuated with the price of copper. The per cent of the metal found in the ore is extremely high when compared with that of the large western deposits. However, different conditions exist in this State. The ores must be mined from veins by underground methods and not stripped from hillsides with steam shovels. Improvements in operations are serving to lower overhead costs and to increase production.

The peak year for copper production was in 1929, when the Fontana and the Cullowhee Mines together produced 15,000,000 pounds. Statistics have been kept only since 1900, and to date approximately 60,000,000 pounds of metal have been produced. Sixty-six mines in fifteen counties have produced copper ores in previous years. Gold and silver have been valuable by-products of the copper industry.

Iron

Iron ore is to be found in many scattered deposits over the State. Most of these ores may be described as "low-grade," containing smaller proportions of iron. As stated in the introductory paragraphs, competition from other regions has brought about the abandonment of all iron workings in the State. The Cranberry Mine still operates as a stone-crushing plant, shipping iron ore to furnaces in Tennessee, when price conditions are suitable.

The ores are of four principal types: (1) magnetite, (2) titaniferous magnetite, (3) hematite, (4) limonite, or "bog" ores. Magnetite is found, either massive or disseminated, in more or less parallel veins or lenses in the gneisses, schists, and other crystalline rocks of Avery and Mitchell counties. Other deposits are found in Granville, Stokes, Surry, Catawba, and Ashe counties. Ores, low in sulphur, phosphorus and titanium but high in iron content, are available in several of the western counties of the State and only need better transportation facilities to make production profitable. The Cranberry Mine contains magnetite ore with these qualities. With existing shipping facilities, this area probably could be ranked second to the more important ores in Alabama.

Titaniferous magnetites occur in a number of localities in the Piedmont and Mountain regions of North Carolina, but no deposits have yet been developed far enough to determine their worth under conditions of large-scale production. The ores contain on the average 13 per cent titanium oxide, and where the percentage is higher, crystals of ilmenite are found intergrown with the magnetite. The titanic iron ores and ilmenite, iron and titanium oxide, occur in the same complex gneisses, ranging from basic hornblende gneisses to acid granites and other igneous rocks. The two most promising areas are the belt to the west of Greensboro extending across Rockingham, Guilford, and Davidson counties, and an area north of Lenoir in Caldwell County.

The hematite and limonite ores occur mainly in mountain valleys in the western part of the State, and in the central portions of the Piedmont. Madison, Cherokee, and McDowell counties are the most important in the Mountain region, and Catawba, Lincoln, and Gaston counties in the Piedmont. W. S. Bailey (Bulletin No. 32, Department of Conservation and Development) regards the so-called "brown hematite" ores as being more likely limonite or goethite, both hydrous oxides of iron. As furnished in carload lots, they are classed as non-Bessemer ores, and contain 45 per cent to 52 per cent iron, 0.25 per cent to 1.25 per cent manganese, 3 per cent to 7 per cent phosphorous, traces of sulphur, and 8 per cent to 18 per cent silica or sand. The variations in iron and silica depend on the care taken in preparing the ore.

The "bog" ores occurring in the Coastal Plain area of the State are limonite deposits. They are not now important, and were worked only during the Colonial days.

The only production of iron ore is in conjunction with the rock-crushing plant at Cranberry, N. C., owned by the Cranberry Furnace Company, Johnson City, Tennessee. Shipments of magnetite ore are made on demand. The ore is exceptionally suited for making high-grade pig iron for castings and for special steels and alloys.

Titanic iron ores are difficult to smelt, and have been generally avoided. The use of titanium for hardening steels and in making steel alloys has been the subject of much research, and it is hoped there may be a demand for these ores. At present rutile and ilmenite, oxides of titanium, supply the market for this element for both metallurgical and chemical purposes.

In general, North Carolina has a fair proportion of the low grade iron ores found along the Appalachian Mountain chain, but the only deposits being commercially worked today are in Alabama and Nova Scotia.

Manganese

Deposits of manganese ore of fair quality are to be found near Sparta in Alleghany County; as magnetite with high manganese content in Ashe County; in "pockets" of pyrolusite on Low Creek in Cherokee County; and as fissures and pockets in quartz veins in Transylvania County, near Brevard on Boyleston Creek.

A seam of manganese ore, four feet thick, is found on Shut-In Creek in Madison County, and very good ore is found in the western part of Surry County. In Cleveland County, near Kings Mountain, a seam of slate approximately 1,000 feet wide carried a low manganese content.

The total production for the period of 1929 to 1935 consisted of two carloads shipped to smelter plants in Birmingham, Alabama. More than \$35,000 has been spent recently in prospecting and investigations, and a manganese concentration plant has been erected, but there is no current production.

In spite of recent reductions of tariff duties on ores containing 10 per cent or more of manganese, the price level is still sufficiently high to make the production of manganese a profitable enterprise in North Carolina.

The rapid increase in steel production and increased uses for manganese alloys provides a sustained demand, and the further development of manganese mining in North Carolina should be expected.

Tin

The tin deposits of North Carolina have been found in a belt extending from a point two miles northeast of Grover, generally parallel to the trend of the rock formations, through the town of Kings Mountain and northeastward to Beaverdam Creek, near Lincoln. In South Carolina to the southwest a tin deposit is found near Gaffney, known as the Ross Tin Mine, which may possibly be an extension of the North Carolina belt.

Pegmatites are the end product of the cooling of molten rock masses which are forced into the cracks of the contracting main body and the openings of the surrounding country rock. In addition to quartz and feldspars found in them, there are volatile or pneumatolytic mineral zones, which include tin. The pegmatites occur in sheets and lens shaped bodies cutting mainly the gneisses and schists. The cassiterite, oxide of tin, is found in some, but not all, of these large-crystalled intrusions, called *greisen* if they contain tin.

Several attempts have been made to work the North Carolina tin ores, with rather indifferent success. The United States is dependent for its supply of tin on importations, with the exception of a small amount produced in Alaska. The U. S. House of Representatives conducted an investigation of tin production in 1934, and it is possible that steps will be taken to locate and develop mines in the United States, either by subsidy or other means of encouragement. The investigation was prompted by world monopolistic conditions tending to maintain the price at a high level in peace-time and controlling the uses of the metal in time of war.

Food-packing, automotive, and building industries consume most of the tin used in the United States. Tinning of metal plates for cans and roofing, terneplate for

gasoline tanks, alloys such as babbit metal used for engine bearings, are perhaps the most important uses for this metal. There is at the present time a firm demand for the metal and indications that this demand will increase in the future.

One important mining company has been actively engaged in exploratory and development work in the area near Lincolnton in Lincoln County. They have recently announced the marking of six well-defined bodies of ore-bearing material. It is expected that large-scale production will begin in the near future.

Chromium

The chromite ore found in North Carolina is in the form of peridotites and other igneous magnesium rocks, or their metamorphic derivatives. There are large areas of such rocks in western North Carolina, and chromite is found in varying amounts in all of them. Several localities are worth prospecting or further development at times when the ore is sold for even average prices.

Four of the most promising areas are:

1. Mine Hill, five miles north of Burnsville in Yancey County.
2. Areas near Webster in Jackson County.
3. Areas on Big Ivy Creek, sixteen miles from Asheville, in Buncombe County. Recent prospecting has been done here, where small grains of chromite have been found in the peridotite and considerable quantities of sands that may be readily concentrated are weathered out on the surface and along this creek.
4. In the Balsam Gap area, on Dark Ridge Creek, just south of the Dark Ridge Crossing on the Murphy Branch of the Southern Railway, is found a vein of chromite ranging from two to three feet in thickness. Three carloads of ore have been shipped, though there is no production at the present time.

Chromium was one of the most important needs during the World War, for hardening steels and manufacturing munitions. Since then, the metal has been adopted for use in a great many industries and its applications are varied. Perhaps the most familiar use is the ornamental "silver" plating for automobiles. This use, however, requires only a small amount of chromium. Most of the consumption goes into treating of steels, where a small proportion adds hardness and toughness without causing brittleness. Motor parts, body frames, and springs use most of the chromium required by the automotive industry. Chromium steels are used also in railroad equipment, since the stronger steels require less mass per structural unit and the "dead weight" can be transferred to pay loads.

Recent metallurgical research has developed processes which make possible the welding of chrome steels. The addition of high nitrogen ferrochromium reduces the grain size while adding other desirable properties. Steels containing 20 per cent or more chromium may now be forged, cold drawn or welded without change or loss of strength. This advance permits the use of chrome steel in machinery, since repairs can be made by welding where replacement would have been necessary before.

Chromite is also used with a filler and binder, such as fire clay, in the manufacture of linings for metallurgical furnaces, because of its high refractory and neutral characteristics. Bricks and cements made for this purpose require quantities of chromium, in amounts second only to the requirements of the steel industry.

These two industries, together with the paint and chemical industries, absorb practically the entire production of chromium. The United States is now the greatest consumer among the nations, the demand for this metal having tripled in the last few years. This increased demand has brought renewed interest in the North Carolina deposits of chromium.

Lead and Zinc

The surface deposits at Silver Hill in Davidson County, after having been worked for gold and silver, yielded lead and zinc ores for several years up to 1913. Parts of this are still considered as suitable for working. Other deposits promising profitable yields are located in Haywood, McDowell, and Montgomery counties. One deposit near Troy, N. C., showed lead (10 per cent to 20 per cent), zinc (20 per cent to 35 per cent), with small amounts of gold and silver. Geologists recently engaged in exploratory work have expressed the belief that there are several workable deposits and it is to be expected that they may soon be in production.

The ores commonly found are galena and sphalerite, usually occurring together. The ores are separated by floatation, roasted to remove sulphur, and refined in furnaces or by electrolysis. Silver and gold are recovered in the refining process.

Lead is used as a metal, as a carbonate (white lead), or as oxides in the manufacture of glass and pottery. Zinc spelter (metallic zinc) is used for galvanizing iron and in the making of brass, alloys, and sheet zinc. Zinc oxide is used in white paints, the chlorides as wood preservatives, while sulphates are used in dyes and for medicinal purposes.

Nickel

Nickel, like manganese and tin, is now imported into this country, largely from Canada and New Caledonia. Prices are high and there is an increased demand for the metal, and for these reasons attention is now being directed to the low-grade nickel ores of Jackson County, N. C. Special interest has been shown in an outcrop of peridotite containing nickel minerals, near Addie on the Southern Railroad. The peridotite is a basic igneous type of rock that was intruded into the Cambrian Carolina and Roan gneisses and schists at such high pressure as to cause fracturing and the opening of fissures. In these openings, and disseminated through some of the enclosing rocks, are the nickel silicates, garnierite and genthite. The minerals are not uniformly distributed, but estimates have been made reaching as high as 350,000,000 tons of nickel ore for the total area.

Analyses of selected samples show from less than 1 per cent to 40 per cent nickel oxide, averaging about 1 per cent. Recovery of the nickel on a commercial scale has not yet been accomplished, but it is believed this may be feasible.

Stainless steels contain varying percentages of nickel, and are relatively light and strong. Gray cast iron containing nickel is also competing with these steels. Large quantities of nickel are used in making alloys of aluminum, and for coinage. Monel metal is one of the best known nickel alloys. The resistance of this metal to corrosive liquids such as sea water, weak acids, dyes, caustic soda, and various solvents, has made a place for it in petroleum refining, chemical manufacturing, the textile industry, building decoration, and other fields.

THE NON-METALS

Abrasives

The abrasive processes, such as cutting, sawing, grinding, and polishing, require corundum, emery, garnets, millstones, and novaculite, all of which are to be found in North Carolina. Recently, however, synthetic and artificial abrasives have replaced most of these materials.

Corundum is an aluminum oxide having a hardness of 9 and ranking next to the diamond, which is rated as 10 on the scale of hardness. Emery, which is a mixture of corundum and magnetite, depends on the percentage of corundum for its usefulness as an abrasive. Carborundum and related artificial products have replaced these two materials. Jackson, Clay, and Macon counties were sources of commercial corundum and emery.

Garnets occur in four varieties in North Carolina: pyrope, almandite, rhodolite, and andradite. All are good abrasives, and with the exception of andradite are gem material when clear and transparent. Garnet sandpaper and garnet cloth are used for polishing and grinding brass. Large deposits of almandite and rhodolite occur in Jackson, Madison, Clay, Macon, and Burke counties. No production is listed at the present time, although renewed interest in garnet is shown by recent requests for information.

Millstone raw material is obtained from the Triassic sandstones in Moore County, and from even-grained granites near Faith and Salisbury in Rowan County. Milling machinery has largely replaced the use of this stone. Formerly, millstones commanded a price of over \$100 per pair, and in the peak year of 1919, production was valued at \$29,025.

Novaculite, an extremely fine-grained silica rock, has been used to make whetstones and was produced in small quantities from counties in the Huronian Slate Belt.

Asbestos

Progress and development in the usages of asbestos and asbestos products present a future for the mining of anthophyllite and chrysotile, the amphibole and serpentine varieties of asbestos, respectively. Anthophyllite occurs in larger quantities in North Carolina, and is found mainly in Ashe, Avery, Caldwell, Macon, and Yancey counties. Fibrous enstatite and anthophyllite occur near Bakersville and Ledger in Mitchell County. Chrysotile is comparatively rare, and no large-scale production has been attempted.

Asbestos occurs as the filling in fissure veins and other openings in massive serpentine rocks and metamorphic schists. Anthophyllite is thought to have been derived from the metamorphism of chrysotile. The asbestos fibres are parallel, and occur either across or along the plane of the vein. Mining by open-pit or underground methods is followed. Grouped veins are a prerequisite for profitable production.

There are three asbestos mines operating in Avery and Macon counties, and recent prospecting indicates possibilities for other mining operation. This interest is caused by the growing demand for short-fibre asbestos by the building industry, for insulating purposes and the manufacture of asbestos wood, asbestos slate, asbestolith, corrugated roofing tile, roofing felt, wall board, and composition flooring. Asbestos is also used in fire-proof paints, boiler and steam pipe coverings, packing in fire-proof safes, and for electrical insulation where heat resistance is required. The best grades are used for chemical filters.

Chrysotile is flexible and is woven into fire-proof curtains for theatres, fire-proof gloves and clothing. It is the more expensive variety, and the long-fibred raw material is rare.

Barium

The principal deposits of barite are found near the towns of Marshall, Stackhouse, Sandy Bottom, and Hot Springs, in Madison County; and about five miles from Bessemer City in Gaston County. The deposits are of medium grade, and heretofore trouble has occurred in trying to market the products. Technical research has resulted in the development of an air and froth flotation method which yields a barite concentrate of 95 per cent or more. The impurities are quartz in the forms of stringers and sand grains, galena, occasional pyrite crystals, a little fluorite, and some calcite. The concentrating method has been employed in South Carolina and Georgia with a high degree of success, and several companies are contemplating its application to North Carolina deposits. Some of the deposits have been stained by iron from the decomposition of the surface rock in the area, and have to be bleached to be salable.

The chief use of barium is in the manufacture of barium hydroxide, employed in the refining of sugar. When ground barium sulphate is mixed with zinc white and used as a base for paints, the product is not affected by chemical fumes and does not change color as do white lead paints. Barite is used as a filler in both the paper and textile industries, in glazing pottery, in rubber goods manufacture, and as a source of barium in making certain chemicals.

Crude barite prices ranged from \$4.22 to \$5.83 per ton, in 1935. Crude barite, 95 per cent or more barium sulphate, was quoted from \$5.00 to \$7.00 per ton.

Bromine

The Ethyl-Dow Chemical Company of Wilmington, N. C., is now operating a new plant near the mouth of the Cape Fear River, removing bromine from the sea water and manufacturing ethylene-dibromide. The plant was constructed in 1933, and has operated almost continuously since its completion.

The plant is located between the ocean and the Cape Fear River. The sea water enters an intake and is pumped into a canal leading to a large storage basin and canal

system leading to the plant, at the rate of 58,000 gallons per minute. The water is first acidified with a 10 per cent solution of sulphuric acid and treated with chlorine, which liberates and replaces the bromine. The water is then pumped to the top of towers, where it falls countercurrent to an upward stream of air that blows out the bromine. The water from the bottom of the towers is discharged through the effluent canal to the Cape Fear River. The air and bromine is forced by fans to the absorption towers, where the bromine is absorbed by a soda ash solution. The liquor, containing sodium bromide and bromate, is pumped to storage tanks. The bromine is then freed by acidifying the liquor and condensing the bromine to a liquid.

The ethylene-dibromide manufactured from the bromine at this plant is used in making ethyl gasoline. Used in connection with tetra-ethyl lead, it enters into more than 70 per cent of all gasoline sold at present.

Clays and Kaolin

The pre-Cambrian shales and clays outcropping in the western part of the State are valuable for their use in brick, face brick, hollow tile, building and flooring tile, and sewer pipe. The rocks are weathered to plasticity in only limited sections, but large amounts are available in Stanly, Union, and Montgomery counties. The cost of producing brick and tile from these North Carolina deposits is much lower than that for similar production in adjoining states, because the clays in this State burn to a hard body at from 1800 degrees to 1950 degrees Fahrenheit.

The Triassic shales in the Deep River and Dan River basins produce clay and shales that are easily worked and have good plasticity. The products are good grade and hard-finish, burning at about the same temperatures as the pre-Cambrian clays. They are adaptable for use in the manufacture of face brick, common brick, hollow building tile, salt-glazed sewer pipe, drain tile, roofing, chemical brick and rings, and floor tile.

The Brevard schists, though not as plastic as the above-named clays, are suitable for common and face brick, hollow tile, and roofing. The bonding strength is lower and the burning temperature about 200 degrees higher than for the pre-Cambrian clays. These schists are found in Henderson, Transylvania, and McDowell counties.

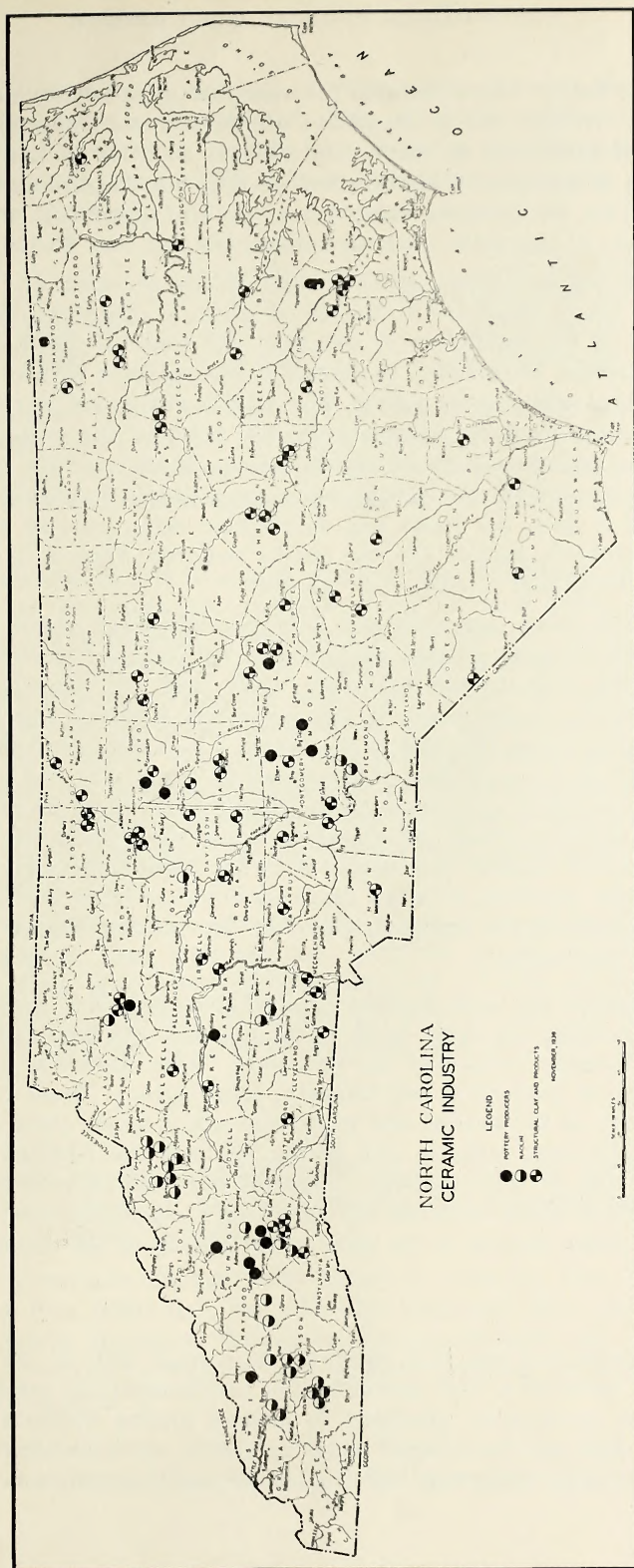
Secondary or sedimentary kaolins along the French Broad River contain sufficient iron oxide and other impurities to produce a red and gray brick finish and to give a cream color to white-ware bodies. The quartz content is low, but the finish burning temperature is approximately 2200 degrees Fahrenheit.

The Cambrian shales found in Madison County, near Hot Springs, have been used for face and common brick, and finish at slightly below 2000 degrees Fahrenheit, giving a full range of flash colors from brown to black.

Many counties contain suitable clays for manufacturing pressed brick and face brick, and small brick plants are scattered over the State. Improved manufacturing methods have resulted in a higher quality product, of more uniform grade. A number of the new schools constructed throughout the State in the past few years have been built of brick manufactured in the same county.

Potteries are more numerous, and the variety of articles and shapes produced has increased until North Carolina pottery is being shipped in carload lots to many of the

PLATE XVII



larger cities of the nation. Clays suitable for manufacture of pottery are found in Burke, Catawba, Lincoln, Wilkes, Surry, Randolph, Henderson and Buncombe counties in the western part of the State, and in Wayne and Wilson counties in the east. Plate XVII shows the location of plants and distribution of deposits for the ceramic industry in North Carolina. With the possible exception of granite quarrying, this industry leads the mineral products of the State, with an annual value of over \$3,500,000.

Kaolin is produced in Yancey, Mitchell, and Macon counties, and especially in the Spruce Pine area, where there are a number of mines in operation. The deposits in the Mountain area are of the residual or *in situ* type, the result of weathering of pegmatite dikes or coarse granites. Chemically, the metallic ions combine with oxygen to form oxides, and the released silica forms quartz. The soluble oxides are leached by percolating ground waters, and the insoluble material remains. Alumina, the oxide of aluminum, and quartz are the principal constituents found in kaolin deposits. This material is mined along the strike or trend of the decomposed pegmatites, in a series of pits. One or more pits are worked at a time, the waste and overburden being used to fill the worked-out holes. The crude kaolin is washed and the quartz removed. Then it is dried, screened to remove float impurities and is ready for market.

Kaolin is used in china, porcelain and semi-porcelain ware, spark plugs, glass melting pots, and different types of tile, particularly for interior flooring and decoration. This substance is the primary mineral of all clays, and the famous English clay is nearly all kaolin. Until recent years, it was impossible to obtain this latter type of clay except by importation from England or Germany. Two reasons account for the former use of foreign clays to the exclusion of American products: (1) the early potteries and clay-working establishments were operated by Englishmen using English formulae, and (2) the American clay was gritty and contained impurities. Today the American kaolin and American-produced English clay prepared by the more modern plants rank with the highest grade foreign products, in many cases excelling the latter because of a lower content of mica impurities. North Carolina is one of the leading States in the nation in improved modern production.

Shipments of kaolin are made to Ohio, Pennsylvania, and New Jersey, to be used in the manufacture of china and china ware. Large amounts are used in the State, and experiments by the Ceramic Division of the Tennessee Valley Authority and other agencies point to both increased production and domestic consumption. These tests have demonstrated the plasticity of the kaolins and prove that a high-grade china can be made from North Carolina kaolin clay, feldspar, and quartz, without the addition of ball clays or English clays. Because of this plasticity, pieces of ware can be molded in four minutes, as compared to fifty to ninety minutes for other clays, while the low coefficient of expansion permits a firing time of six to eight hours instead of the usual thirty to thirty-six hours.

Coal

In the past decade coal has been produced on a small scale in the Deep River area. However, the coal contains a high percentage of low-temperature volatile materials, and without the proper precautions practiced in modern mining methods, there is danger of explosion. This fact has discouraged more extensive commercialization, and coal is now mined only in small quantities for immediate local consumption.

Tests by the United States Bureau of Mines Experimental Station at Pittsburg to determine the possibilities of coke production, show the coal in the Deep River area to be equivalent to that found in the Freeport seam in Pennsylvania. A fifteen-pound charge taken from the Cumnock Mine showed the following results at a final temperature of 800 degrees Centigrade:

Coke Yield	75 per cent of charge
Gas Yield	8,000 cubic feet per ton of coal
Ammonium Sulphate	23 pounds per ton of coal
Tar (dehydrated)	22 gallons per ton of coal

The gas can be used locally for brick and tile ovens, and the coke is readily salable. The use of pulverized coal as fuel for steam electric plants in this area is feasible, as experiments show that the coal seam, including the parting, gives 12,000 to 14,000 b.t.u. when pulverized. Several plants have used the coal in this form and found it very satisfactory.

The Deep River coal field is located in parts of Lee, Chatham, and Moore counties, in what is known as the southward extension of the Durham Triassic Basin. Changes of sedimentation in the Basin indicate that the origin of the coal was probably in localized swamps. The total Triassic section varies to a probable maximum of 4,000 feet in thickness, and coal beds occur approximately half way. There are usually two seams, the top one about thirty to forty-eight inches thick and the bottom fifteen to thirty-six inches, separated by a "bony" parting. The three layers form an aggregate of about six feet in the mines, but outcrop at the surface as indistinct black shaly bands. The rocks in the area are shales and sandstones, varying in color from red and drab green to black. Small faults and scattered dikes of intruded rocks hinder mining operations in parts of the field.

The Deep River Field is the only area with prospects of commercial coal production. The so-called Dan River Coal Field has been carefully surveyed and found to contain bituminous black shale, with scattered small lenses of coal only a few inches thick. However, these shales contain nitrogen as ammonium sulphate and phosphorus as calcium phosphate, and when ground and spread on fields they are better than many commercial fertilizers.

Feldspar

Mineral feldspar was produced locally for North Carolina potteries prior to the shipment of the first carload in 1911, and since then its production has become an active branch of the State's mining industry.

The feldspar producing district in this State includes (1) The Cowee-Black Mountain Belt, (2) The Blue Ridge Belt, and (3) The Piedmont Belt, and embraces Macon, Jackson, Transylvania, Haywood, Buncombe, Yancey, Mitchell and Avery counties. The last three named comprise the Spruce Pine District, covering 200 square miles, which is the largest producing area.

Two types of feldspar are mined in North Carolina. The first is potash spar or orthoclase, and the second is soda spar or the plagioclase type, albite. The first variety

is produced in the greater quantities and is better adapted for use in the ceramic industry, though the properties of both are practically the same.

Feldspars are found in nearly all igneous rocks, but those for commercial use are found in pegmatites, an intruded granite with large crystals from slow cooling. The characteristic appearance is that of a rock with coarse interlocking crystals, and the principal constituents are feldspars, quartz, and muscovite. Associated minerals are beryl, biotite, columbite, galena, garnet, kyanite, hematite, magnetite, pyrite, tourmaline and others. Usually they all occur in well-formed crystals, and pegmatites are good sources of mineralogical specimens. The sources of commercial feldspar are zones where the feldspars predominate and quartz and other minerals are almost absent.

The use of feldspars is governed by their quartz content, and they must be low in discoloring impurities, especially iron. When the quartz content is over 5 to 10 per cent, the spar may be used as a flux in the manufacture of pottery, electrical porcelain, and some enameled wares. Abrasive soaps of the "non-scratching" variety contain finely ground feldspar that is practically free of quartz. When spar is used as a binder in the manufacture of glass and of carborundum or emery wheels, 25 per cent of the material may be quartz. Should commercial extraction become possible, the potash content of the orthoclase feldspars could be used in fertilizer.

Feldspar is mined by the open pit method, and the overburden is removed by scrapers, draglines, or hydraulic means. Air and hand drills are employed, and enough dynamite is used to loosen the spar. The mineral is sorted by hand and sent to a grinding mill, where it is crushed to go through a three-inch mesh, and is then placed on "picking belts" from which the quartz, mica, and other impurities are thrown out by hand.

At present two grinding mills are in operation in North Carolina, and these are of sufficient capacity to grind almost the entire output of feldspar from the State. The products are graded and shipped according to the free silica or quartz content, and the degree of fineness to which the material has been ground.

Feldspar mining is one of the most important mineral production activities of North Carolina, and this State is by far the leading producer in the Nation, making large shipments to points in the East and Midwest for the ceramic and glass industries. Production statistics are shown in Tables XXXVIII and XXXIX.

Kyanite

Large quantities of kyanite are deposited in Yancey, Clay, Haywood, and Iredell counties, as well as sections of Cherokee, Graham, Caldwell, Jackson, Mitchell, Avery, and Wilkes, with the first four named the most promising for commercial development. The material is found near Black Mountain in massive deposits, but as a rule crystals occur disseminated in schists. This type of deposit is best adapted to mining operation, because it is larger and more easily adjusted to concentration methods. By classifying and tabling methods a 90 per cent kyanite product is achieved, but the new flotation processes allow a concentrate of 95 per cent or more of the mineral.

The development of kyanite as an industrial mineral has taken place in the last fifteen years, and research is now being conducted to discover new uses for this substance, particularly in the field of ceramics. The United States Bureau of Standards reports that

porcelain bodies containing high percentages of kyanite possess great tensile strength, high di-electric properties, and low thermal expansion. The mineral is used in spark plugs, refractory brick, porcelain ware, both china and electrical, sagger clays, and in glass to add toughness.

Kyanite, andalusite, and dumortierite are allied minerals. All three have similar usages, contain aluminum silicate, and invert to sillimanite plus glass at a temperature slightly over 1350 degrees Centigrade. Although refractory and ceramic uses are the same, kyanite is usually calcined because of a higher coefficient of expansion.

Production and sales from North Carolina were substantially greater in 1935 than in the previous year. The Celo Mines, Incorporated, of Burnsville, Yancey County, has been a steady producer of kyanite concentrates and has recently enlarged its plant, while several small producers ship impure lump kyanite ore. The only figures available on this mineral are for the United States a whole. The 1936 *Minerals Yearbook* gives 4,000 tons as domestic production for 1935, and imports in excess of 1,000 tons. Prices ranged from under \$10 per ton for impure "dornick" ores, to between \$25 and \$36 per ton for kyanite concentrates.

Lithium

Although lithium is a metal, it is listed with the Non-Metallic Group of minerals because most of its uses are non-metallic.

Spodumene, a lithium-aluminum metasilicate, is found in Gaston, Lincoln, Cleveland, and Alexander counties in certain of the pegmatites. Lepidolite, amblygonite, and lithiophilite are other lithium minerals, the first a mica and the last two phosphates.

Spodumene is more evenly distributed than most metalliferous minerals found in veins, and spodumene pegmatites often form ridges and hilltops because of their resistance to weathering. They are light colored, and of smaller grain than most pegmatitic material. Colored minerals are usually lacking, though occasional small black tourmaline and beryl crystals are found, some of them suitable for gem material. Cassiterite, or tin oxide, is often found where the quartz and muscovite replacement is prominent.

In recent tests conducted by the United States Bureau of Mines, representative samples of the North Carolina deposits yielded 15 per cent to 20 per cent spodumene concentrates containing 6 per cent to 7 per cent lithia (lithium oxide), and the Kings Mountain area in this State compares favorably with such regions as the Black Hills of South Dakota, the Emudo district in New Mexico, Pala in California, and the area at Cat Lake in Manitoba, Canada. Research in progress on the metallurgy of lithium minerals gives promise of a new and profitable industry for North Carolina.

Lithium metal is used in small percentages for hardening aluminum and bearing-metal alloys, but the most important developments are in the non-metallic field. The most notable new use is in the process of air conditioning. Concentrated lithium chloride solution sprays will dehumidify air, and the solution may be regenerated by boiling out the collected moisture. This system is especially advantageous for industrial drying. Various lithium salts are used for medicinal purposes, and lithium hydroxide is used in alkali storage batteries. Lithia is substituted in zincless glazers to prevent cracking in white

and opalescent glass products and in enamels, while the use of lepidolite instead of feldspar in porcelains improves the appearance of the ware and increases resistance to sudden temperature changes.

The following statement in the *Minerals Yearbook* for 1936 indicates that prospects are excellent for large-scale commercialization of lithium in this State.

"During 1935, Frank L. Hess and Oliver C. Ralston, of the United States Bureau of Mines, investigated disseminated spodumene deposits in the vicinity of Kings Moun-

TABLE XXXVIII
MINERAL PRODUCTION IN NORTH CAROLINA—1915-1925

By Five-Year Periods
(U. S. Bureau of Mines Statistics)

Product	Unit	1915		1920		1925	
		Quantity	Value	Quantity	Value	Quantity	Value
Abrasives			\$ 12,002		\$ 14,226		
Clays	Short Tons.			8,545	43,672	18,983	\$ 310,683
Coal	Long Tons.			11,540		58,160	65,153
Copper	Pounds . . .	17,170	3,005				
Gold	Ounces . . .	8,320.55	172,001	54	1,100	896.87	18,540
Granite: Rough	Tons		191,796				
Crushed	Tons		1,246,810		1,968,912	1,200,640	2,864,490
Feldspar	Tons	20,635	55,991	35,883	187,136	76,806	496,563
Limestone	Tons		82,672		135,675	148,530	238,310
Mica Sold: Sheets	Pounds . . .	281,074	266,650	1,084,946	405,654	592,478	105,376
Scrap	Short Tons.	2,840	33,943	2,823	91,653	5,095	74,818
Mineral Waters . . .	Gallons . . .	132,813	18,745	115,315	15,545		
Sand and Gravel . . .	Short Tons.	377,739	113,180	520,125	409,591	1,108,035	886,351
Silver	Ounces . . .	1,463	743	10	11	108	75
Talc, Soapstone, and Pyrophyllite . . .	Short Tons.	1,454	21,501	2,267	75,474	6,040	48,550
Quartz: Silica	Short Tons.						21,286

tain, North Carolina, and as a result of this work an eastern source of lithium minerals may be developed as soon as the concentrating problems are solved."

Limestones, Marbles, and Marls

The yearly production of limestones, marbles, and marls in North Carolina is now valued at half million dollars, and this figure may be increased with further development of the industry.

Limestones occur as such and as the variety, dolomite, which is calcium-magnesium carbonate. Calcareous marl, shellrock, and impure limestones are found in the Coastal Plain and are suitable for making lime, while true limestones occur in the Piedmont and Mountain areas in Swain, Henderson, McDowell, Madison, Buncombe, Catawba, Cherokee, Clay, Cleveland, Gaston, Jackson, Lincoln, Macon, Mitchell, and Stokes counties. This material is used principally in crushed rock and road metal, dehydrated and hydrated lime, since few locations produce limestone with high enough calcium carbonate content for the manufacture of Portland cement. The State Highway and Public Works Commission operates several quarries for road metal, while building stone is produced for local construction.

TABLE XXXIX
VALUE OF MINERAL PRODUCTION IN NORTH CAROLINA—1929-1935

Product	1929	1930	1931	1932	1933	1934	1935
Clay (Kaolin)	\$ 282,682	\$ 391,571	\$ 195,700	\$ 202,528	\$ 102,814	\$ 106,742	\$ 119,272
Coal	177,000	100,000	*	*	*	*	*
Copper	*	*	*	*	*	*	*
Feldspar:							
Crude	598,938	593,552	505,525	300,877	471,312	465,214	482,729
Ground	1,236,206	1,012,915	761,080	614,936	707,667	847,835	1,043,979
Gold and Silver	11,283	22,963	12,956	6,847	13,463	24,056	85,114
Granite	5,344,032	3,473,406	3,607,966	1,323,780	1,631,464	1,706,570	1,422,174
Limestone and Marble	277,846	244,038	98,956	128,172	305,029	134,026	120,418
Mica:							
Sheet	150,293	112,451	51,657	18,322	21,107	38,674	77,598
Scrap	53,855	75,400	5,312	4,837	6,918	47,246	153,553
Quartz	28,709	23,835	11,460	*	65,483	*	*
Sand and Gravel	1,020,533	437,555	238,053	99,640	201,113	225,588	310,291
Talc	81,306	105,000	170,250	202,229	135,523	165,523	220,074
*Undistributed	2,266,411	1,820,000	808,508	354,110	579,000	1,892,312	2,267,360
**Total	11,529,094	8,412,686	6,467,423	3,256,278	4,240,893	5,653,786	6,302,562

*These figures withheld to avoid disclosure of individual operations. Value of these products is included in Undistributed and Total.

**Figures not available for brick and tile, bromine, cement products, and pottery.

Marble deposits in the southwest corner of the State follow an almost continuous belt, 1000 to 2500 feet wide and 23 miles long, extending across Macon and Cherokee counties, while Mitchell, McDowell and Swain counties also contain marble deposits. The grade of the stone is determined by grain size and color, as well as purity. Crystallization varies from medium to fine grain, with a predominance of the former, and the colors range from white through mottled gray and blue-gray to pinkish. Along a line from northeast of Topton and east of Red Gap in Swain County, to near Hewitt, there are elongated lenses of marble from gray to almost black, and cream colored to pink in color.

There are areas for profitable quarrying in North Carolina, with good grades of marble for building, ornamental, and monumental purposes, although no marble of statuary grade has been found in the State. Until recently North Carolina marbles were considered to have too much jointing and fracture to be well adapted to commercial use, but quarrying and core drillings have revealed areas containing sizeable blocks of the stone, some being too large for freight car shipment.

There are three production companies and four quarries for marble in the State, one in Swain and three in Cherokee County, as follows:

Columbia Marble Quarries at Marble and at Murphy.

J. M. Kilpatrick Company at Marble.

Nantahala Company at Hewitt.

Recent tests by the United States Bureau of Mines and the Massachusetts Institute of Technology show high tensile and compression strengths for North Carolina marbles. They are nearly unstainable because of their low absorption of water, oil, grease, and organic substances. The fine-grained white marble is equivalent to the famous Carrara marble for most purposes.

Marls occur in extensive areas and are found in nearly all of the eastern counties of the Coastal Plain. The calcium carbonate content ranges from 30 per cent to 96 per cent, the higher percentage marls being used for either hydrated or dehydrated lime. Marl as dug from the pits is used for agricultural purposes. The impurities are sand, clay, pyrite, and organic substances. Marl deposits occur in twenty-one counties, as follows: Beaufort, Bertie, Bladen, Brunswick, Columbus, Craven, Duplin, Greene, Halifax, Hertford, Jones, Lenoir, New Hanover, Northampton, Onslow, Pender, Pitt, Robeson, Sampson, Wayne, and Wilson.

Mica

North Carolina produced 55 per cent of the total output of mica in the United States in 1935. New Hampshire, producing 14 per cent of the total, was second. New uses of ground and scrap mica are being developed, and it is expected that the marked increase in production during 1935 will be maintained. The production of mica in the State is shown in Tables XXXVIII and XXXIX. There are now eighty-eight mines and eighteen plants located in sixteen counties, in active production.

The mica is found in two varieties, muscovite and phlogopite, the former being more abundant. Twenty counties or more, in an area one hundred miles wide lying parallel to the Blue Ridge, contain mica deposits. Of these, Avery, Macon, Mitchell, Jackson, Haywood, and Yancey are the more important. Feldspar and mica occur and are produced together. The better grades of mica in "books" of suitable size for punching and cutting is found in irregular and scattered pockets of pegmatites, while mica suitable for large sheets is still more rare, often commanding prices from \$80.00 to \$200.00 per pound.

Mica is found with kaolin in the weathered pegmatites. New processes have been developed for washing the kaolin and recovering the fine mica, and more than one-third of the scrap mica is produced this way. Scrap mica is also produced by grinding muscovite, chlorite, and sericite schists.

The uses to which mica is put are many and varied, depending largely upon the size of the "books" or sheets in which it is found. Sheets of varying size are required in many kinds of electrical machinery and fittings. Ground mica is used to give luster to paints and wall papers, in lubricating oils, roofing, fireproofing and insulating materials, and as bonding and filling material in various rubber products.

Vermiculite, a hydrated form of mica, is found in large quantities in the extreme western counties of the State. These deposits are the only ones now known that are capable of profitable production, having a much more favorable market than the vermiculite deposits of Montana and Colorado. This mineral has a large and permanent exfoliation and expansion when heated. The fluffy product resulting is then pressed, giving a material having most of the characteristics of cork but also being fireproof and suitable for easy working.

The most important present use is in insulating wall plasters, but recent experiments indicate possibilities for use in house insulation, cements, refractory bricks, paints, fillers, and accoustic plasters. The raw vermiculite sells for approximately \$7.00 per ton, while the calcined or expanded material sells for varying prices up to \$20.00 per ton.

Granite

The granites of North Carolina are widely distributed and greatly varied in character and color. The most famous of these varieties is the "Salisbury pink" of Rowan County and the "Mt. Airy" granites.

While granites, gneisses and allied stones are to be found in every physiographic region, the chief producing centers are located in Rowan, Surry, and Vance counties. Smaller workable areas of excellent stone are to be found in counties on the inner margin of the Coastal Plain, especially in Johnston, Nash, Wake, and Wilson counties.

The granites of the Coastal Plain area are massive biotite forms, varying from fine even-granular to coarse porphyritic texture and from gray to pink in color. Well developed jointing prevents quarrying of large blocks, and most of this granite is used as crushed stone for construction purposes.

The texture of granites in the Piedmont section varies from fine to medium, and the color from nearly white to the darker shades of gray. The beautiful pink granite found in the vicinity of Salisbury is another variety.

Granite rocks are widely distributed in the Mountain Section, most frequently schistose and biotite bearing, though massive formations are also plentiful.

Several unique granitic rocks, which are useful for decorative work in building and monumental construction, are found in the State. The chief of these are leopardite, a quartz-porphyry found near Belmont Springs, Mecklenburg County; orbicular gabbrodiorite, found near Cooleemee, Davie County; and blue-gray or black granite near Barber Junction in Rowan County.

The production of granite is shown in Tables XXXVIII and XXXIX. The uses, ranked in the order of commercial importance, are: crushed stone, building stone, curbing and flagging, monumental stone, and paving blocks.

Sand and Gravel

The sand and gravel produced in North Carolina consists chiefly of building sand, paving sand, engine sand, gravel for railroad ballast, gravel for road making, and a small amount of fine sand for polishing and grinding. No glass sand has yet been produced, although a great many deposits have been examined and tests have been made on samples from Moore County in the vicinity of Aberdeen.

Sand, for all types of products, is composed chiefly of the mineral quartz, SiO_2 , and when pure it is colorless or white with a glassy appearance, with hardness of about 7 in the standard scale. The quality of sand depends on the shape and size of the grains and on the amount of impurities, which in turn depend on the type of rocks from which it was formed. Since the rocks of this State are chiefly the crystalline variety, composed of quartz, feldspar, muscovite mica and the ferro-magnesian minerals as biotite mica, hornblende, augite, etc., the chief impurities are organic material, feldspar, mica, hornblende and clay which is the result of weathering of these minerals. Most of the clay, mica, and organic matter is eliminated by washing and screening.

The gravels found in the lower Piedmont and Coastal Plain areas are composed of quartz pebbles, from veins in the Proterozoic rocks, rounded by weathering and stream action. The gravels of the upper Piedmont and Mountain areas are formed from the older crystalline rocks, and are more or less rounded. Many of these gravels have to be crushed and screened before using.

The deposits of gravel in the Mountain and upper Piedmont areas are found along the stream bottoms, but in other lower sections they are widely distributed. The best deposits are in "beach terraces" along old shore lines lying generally just east of the "fall line." Important deposits have been worked in Anson County near the Pee Dee River, Moore County, Harnett County near Lillington on the Cape Fear River, and along the Roanoke River in Halifax and Northampton counties.

Talc, Soapstone, and Pyrophyllite

Talc, when pure, is a light green or white foliated mineral composed of magnesium silicate. The most important deposits in North Carolina are found in Swain County near the towns of Hewitt, Maltby, and Kinsey. Other deposits are to be found in Yancey, Mitchell, and Avery counties.

This is a secondary mineral formed from magnesian rocks. While occasionally pure talc is formed, the usual result is talc schist, or soapstone. The latter is found in massive bodies with a fine granular to cryptocrystalline structure, forming with the binding impurities a soft but uniform body.

Pyrophyllite, a hydrous aluminum silicate, is almost identical in form and characteristics, and is used as a substitute for talc in many products. Though rare, North Carolina contains large quantities, the only commercial deposits to be found in the United States. The principal production is now being made in Moore, Randolph, and Orange counties. Recent new discoveries have been made, which indicate the possibilities of many new uses, replacing special clays, sizing materials, fillers, and low-grade materials used in battery boxes, rubber goods, and roofing materials. At present, pyrophyllite is

strongly competitive at prices up to \$5.00 per ton. It is being used also in certain ceramic processes.

Talc, soapstone, and pyrophyllite are mined by open pit methods. When soft and in sufficient quantities, loading is done by steam shovels. Improved methods have been devised to remove grit from talc deposits, recovering high concentrations of uniform quality. This is important in connection with ceramic uses, where purity and freedom from iron are necessary. Talc is used for filler in paper processes, as lubricant, in toilet powders, paints, crayons, and heat insulators. Soapstone is used extensively for wash tubs, sinks, table tops, switchboards, hearthstones, and furnace linings. Better and more compact grades are used as gas-burner tips, slate pencils, tailors' chalk, and in sculpture.

Because of their similarities in character and use, talc, soapstone, and pyrophyllite are considered as one product in Tables XXXVIII and XXXIX.

The producers of talc and pyrophyllite in North Carolina, listed by counties, are:

County	Name of Owner	Name of Mine	Location
Cherokee	Clinchfield Sand and Feldspar Co.	Maltby	Murphy
Cherokee	Carolina Talc Co.	Carolina Talc Co.	Murphy
Cherokee	W. R. Lunsford	Maltby	Marble
Cherokee	J. M. Kilpatrick	Maltby	Marble
Macon	Philip S. Hoyt		Franklin
Madison	Georgia Talc Co.		Marshall
Madison	A. B. Silver	Little Edwards	Mars Hill
Moore	Standard Mineral Co., Inc.	Gehardt	Hemp
Moore	Talc Mining & Milling Corp.	Glendon	Glendon
Randolph	Tennessee Mineral Products Co.	Staley	Liberty
Swain	Nantahala Company	Nantahala	Hewitt

GEM AND PRECIOUS STONES

North Carolina has produced gems and precious stones in wide variety. Among these are varieties of quartz and opal, varieties of beryl and spodumene (hiddenite), garnet (particularly rhodolite), zircon, rutile, cyanite, epidote, tourmaline, and diamonds. Gems have been found widely scattered in the different counties of the Piedmont and Mountain sections, Alexander, Burke, Cleveland, Iredell, Jackson, Lincoln, Macon, Mitchell, Transylvania, Warren, and Yancey counties having all been producers from time to time in the past. There has never been any systematic prospecting or mining for precious stones in the State. Most of the discoveries have been accidental, but some valuable deposits have been found, and for a long time North Carolina was a regular producer of gems.

Diamonds

Thirteen authentic specimens have been identified with reference to location. The largest diamond on record from this State, weighing 4 1-3 carats, was found in 1886 near Dysartville. Diamonds have been found in McDowell, Burke, Rutherford, Lincoln, Mecklenburg, and Franklin counties.

Rubies and Sapphires

These are the more familiar gem varieties of the mineral corundum. Transparent corundum crystals occur in many other colors, and all are valuable. These gem stones

have been produced at Corundum Hill in Macon County. Sapphires have also been found at Montvale in Transylvania County, and at Sapphire in Jackson County. The best ruby was valued at \$1,500. Ruby corundum has been found in Macon and Transylvania counties.

Beryl

When clear and transparent, this stone is commonly sold as an emerald. It is found principally at Hiddenite, in Alexander County. Hiddenite, a mineral, is also found at the place of the same name, and is of value. It is a variety of spodumene, yellow to green in color, associated with the aquamarine and emerald. It is mined in veins occurring in the biotite gneiss. This is the only known deposit of such mineral.

Quartz

The mineral quartz furnishes many of the common gem stones, and is found in many colors and forms. It may be cut and polished to make attractive gems. Cairngorn stone (smoky quartz), amethysts, citrine topaz, and rock crystal are the more important varieties found in North Carolina. Sagenite, or Venus Hairstone, crystal quartz enclosing hairlike crystals of rutile, is found in Alexander and Iredell counties. Other quartz gems are chrysoprase, rose quartz, morion, and aventurine. Quartz gem stones are found in Alexander, Iredell, Macon, Catawba, Burke, Randolph, Lincoln, and Ashe counties.

Other gem or precious stones found in North Carolina are staurolite, spinel, peridot, lazulite, and serpentine. Most of these minerals are common, and only the rare, clear and transparent varieties, free from flaws, are treasured.

CHAPTER IX

WATER RESOURCES OF NORTH CAROLINA

An abundant, though not excessive, annual rainfall throughout the State provides ample quantities of water to supply the needs of our numerous streams and rivers for continuous flow during all seasons of the year. These streams form well-developed river systems throughout the length and breadth of North Carolina, which serve to make the State well drained; provide abundant quantities of surface water for industrial, municipal, and domestic use; offer excellent opportunities for hydro-electric and mechanical water power development; are readily adapted for navigational purposes in the eastern section; and present recreational advantages in the form of swimming, boating, and sport fishing.

The Great Divide, formed by the Blue Ridge and other mountain ranges, separates the drainage of the State into two main groups of river systems: those lying west of the Divide, which ultimately empty their waters into the Gulf of Mexico through the Ohio and Mississippi River systems; and those east of the Divide, which drain into the Atlantic Ocean. This Divide, following the highest mountains and table lands on the eastern side of the American continent, crosses the State in a northeast-southwest direction, entering the northern boundary of the State between Surry and Alleghany counties and emerging on the southern boundary between Polk and Henderson counties. The river basins lying west of the Divide include the systems of the New River, Watauga, French Broad, Little Tennessee, and Hiwassee rivers; while those east of the Divide having Atlantic Ocean drainage include the systems of the Broad, Catawba, Yadkin, Cape Fear, Neuse, Tar, Dan, Roanoke, and Meherrin-Chowan rivers. The following tabulation lists the principal rivers, showing the areas of their respective drainage basins lying within the boundaries of North Carolina.

DRAINAGE AREAS IN NORTH CAROLINA

TABLE XL

GULF OF MEXICO DRAINAGE		ATLANTIC OCEAN DRAINAGE	
River Basin	Drainage Area in Square Miles	River Basin	Drainage Area in Square Miles
New River	760	Broad	1,450
Watauga	220	Catawba	3,250
French Broad	2,825	Yadkin	9,300
Little Tennessee	1,875	Cape Fear	8,500
Hiwassee	650	Neuse	4,450
		Tar	3,075
		Dan-Roanoke	3,375
		Meherrin-Chowan	1,175

A considerable coastal area of the State is not included in the above tabulation, since the drainage areas of the river basins emptying into the Atlantic are considered to extend in an easterly direction only as far as tide-water. This coastal area includes a number of lesser rivers which are relatively short, though generally broad and deep. Among these may be mentioned the Pasquotank, Little and Perquimans rivers, lying north of Albemarle Sound; Alligator River, south of Albemarle Sound; Pungo River, emptying in Pamlico River and Pamlico Sound; Whiteoak and New rivers, discharging into the ocean; and the Waccamaw River, which enters South Carolina and the Atlantic Ocean through Winyah Bay.

STREAM GAGING

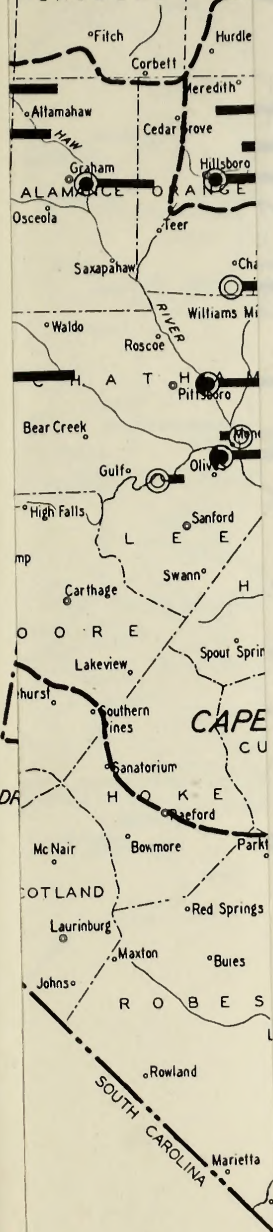
Of primary importance to the intelligent utilization of water resources in any area is the activity of stream gaging. The State of North Carolina has recognized the great value derived from such work, in co-operation with the U. S. Geological Survey and other agencies has maintained and operated numerous gaging stations throughout the various river basins, compiling valuable continuous discharge records at these stations. While additional stations and more data are desirable, the information which has been recorded to date is quite representative of stream flow conditions throughout the State. The work has been carried on continuously since 1889, and at present there are a total of 95 active gaging stations located in the principal drainage basins on the main rivers and their tributaries. Records have been gathered at 69 other stations which are no longer active, and these, together with the active stations, make a total of 164 locations throughout the State at which stream flow data has been recorded. There are four stations having continuous records of 40 years or more; two located in the Little Tennessee river basin, and one each in the French Broad and Hiwassee river basins. There are two stations having records of 35 years or more, one in the Cape Fear basin and one in the Yadkin river basin. Three stations have records between 20 and 30 years of length; 16 have records between 10 and 20 years; 62 between 5 and 10 years; and 77 have records of less than 5 years. Copies of any stream flow records in the State may be obtained from the Water Resources and Engineering Division of the North Carolina Department of Conservation and Development, or from the U. S. Geological Survey District Office at Asheville, N. C.

WATER SUPPLIES

The use of water for drinking purposes is of first importance in any development of water resources. The abundant quantities of water available has led to the development of 129 municipal public water supply systems derived from surface supplies. In addition to the surface supplies, there are 146 towns which have public water supplies developed from ground water sources. Together, these make a total of 275 cities and towns in the State having developed public water supplies, which represents a large percentage of the total number of more important towns, considering the fact that the 1930 census lists a total of only 68 cities and towns in North Carolina as having a population of 2,500 or more.

Of the 275 public water systems, there are 98 filtered surface supplies, 31 unfiltered surface supplies, 128 well supplies, and 18 spring supplies. In general, towns lying in the coastal plain, piedmont and eastern mountain regions, which have developed surface supplies, have found that filtration is necessary, due to pollution of the streams from sewage, industrial and trade wastes. In the mountain and western piedmont sections, where the concentration of population and industrial establishments is less, pollution of the streams, particularly the smaller ones, is much less than in other sections of the State; and it is possible to utilize unfiltered surface water, with only sterilization treatment, for public use. Although supplies developed from wells are found throughout the State, this type of supply is more common in the Coastal Plain and eastern Piedmont sections. The few towns which utilize springs as developed supplies are located principally in the Mountain region.

**SAN JOE RIVER
DRAINAGE AREA 3375**



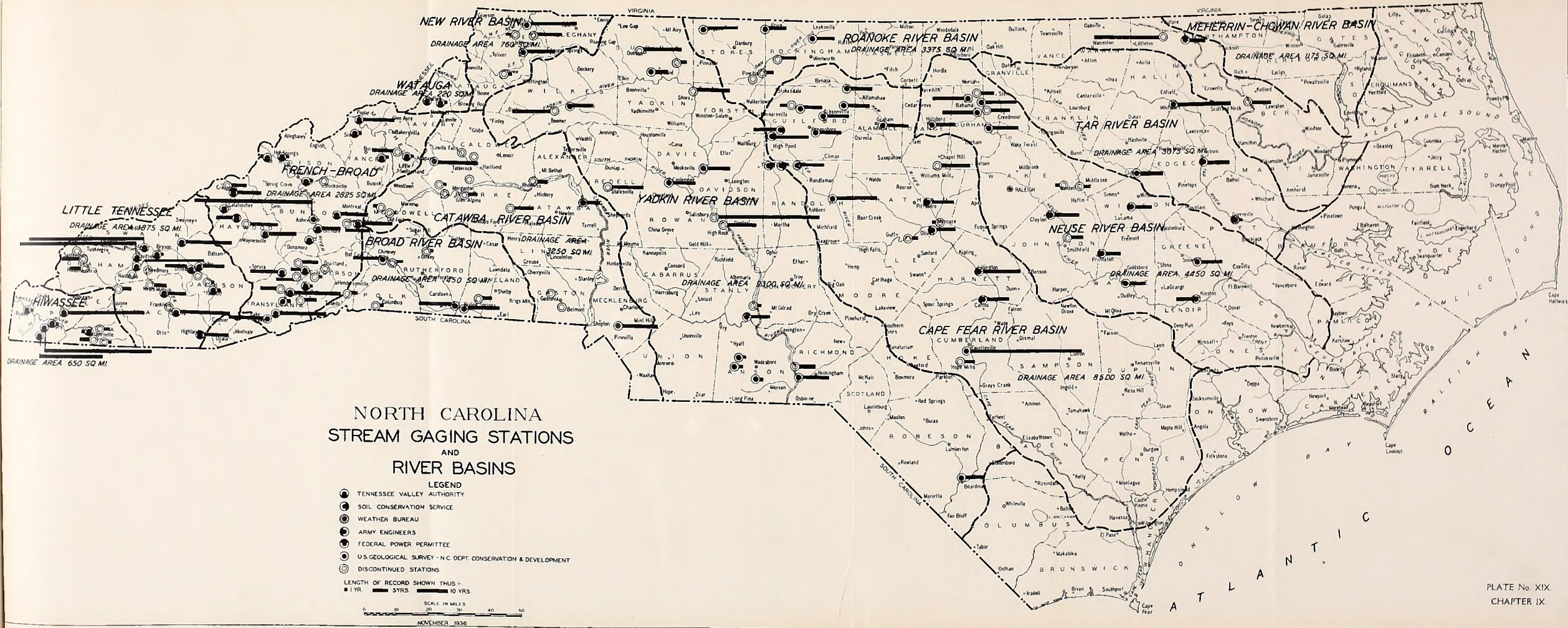
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NORTH CAROLINA
STREAM GAGING STATIONS
AND
RIVER BASINS

- LEGEND
- TENNESSEE VALLEY AUTHORITY
 - ⊕ SOIL CONSERVATION SERVICE
 - ⊞ WEATHER BUREAU
 - ⊡ ARMY ENGINEERS
 - ⊠ FEDERAL POWER PERMITTEE
 - ⊡ U.S. GEOLOGICAL SURVEY - N.C. DEPT. CONSERVATION & DEVELOPMENT
 - ⊙ DISCONTINUED STATIONS
- LENGTH OF RECORD SHOWN THIS -
1 YR 5 YRS 10 YRS

SCALE IN MILES
0 10 20 30 40 50
NOVEMBER 1936

Information relating to the chemical quality of the surface waters through the State has been compiled and published as Economic Paper No. 61 of the North Carolina Department of Conservation and Development, entitled *Preliminary Report on the Chemical Quality of Surface Waters of North Carolina with Relation to Industrial Use*. In this publication are the results of analyses of 185 water samples, of which 174 samples are from surface sources and 11 samples from underground sources.

Table XLI is abstracted from this publication, and included herewith to illustrate the quality of surface water which may be expected in each of the three main physiographic divisions of the State.

TABLE XLI
AVERAGE ANALYSIS OF SURFACE WATERS BY REGIONS

	Coastal Plain		Piedmont Plateau		Mountain Region	
	No. Analyses Considered	Parts per Million	No. Analyses Considered	Parts per Million	No. Analyses Considered	Parts per Million
Silica (SiO ₂)	16	13.	38	16.	74	10.
Iron (Fe)	16	0.6	37	0.81	74	0.21
Calcium (Ca)	16	4.7	38	5.2	74	2.4
Magnesium (Mg)	16	1.9	38	1.9	74	1.
Sodium (Na)	15	5.4	38	4.2	74	2.2
Potassium (K)	15	1.1	32	0.98	74	0.58
Carbonate radicle (CO ₃)	26	0.	34	0.0	74	0.
Bicarbonate radicle (HCO ₃)	15	21.	36	21.	74	12.
Sulphate radicle (SO ₄)	16	4.9	38	5.9	74	2.4
Chloride radicle (Cl)	17	7.8	38	4.6	74	1.9
Nitrate radicle (NO ₃)	19	0.60	37	0.83	72	0.33
Total dissolved solids at 180° C.	17	57.	36	62.	74	31.
Total hardness as CaCO ₃ (calc.)	15	19.	36	20.	74	10.
Color	14	34.	32	31.	73	14.
Turbidity	16	66.	35	102.	60	34.
Suspended matter	17	48.	35	61.	74	11.
Alkalinity	15	15.	33	18.	29	11.

POTENTIAL WATER POWER

In the descent of the rivers from the mountains, both east and west of the Divide, there exists tremendous amounts of potential water power which can be readily converted into hydro-electric energy. A large amount of this power has been developed by various power companies but there still exists a great deal of undeveloped potential water power on the main rivers and their principal tributaries throughout the whole State.

The U. S. Army Engineers, as directed and authorized by Congress, have published comprehensive reports on the more important rivers, in which they have suggested and analyzed various plans for development considering power, flood control, and navigation, both singly and collectively. Practically all of the potential water power sites have been analyzed and their possibilities reported in these publications. These reports are by far

the most comprehensive and valuable sources of information on potential water power and the following table is based on their conclusions.

TABLE XLII

SUMMARY OF POTENTIAL WATER POWER DEVELOPMENT IN NORTH
CAROLINA—CAPACITIES EXPRESSED IN HORSE POWER

Cape Fear River Basin

(Independent Operation)

Bynum	Haw River	39,600
Moore's Mill	Haw River	30,000
Mandale	Haw River	30,000
New Hope	Haw River	45,000
Smiley Falls	Cape Fear River	31,900

Total 176,500

Roanoke-Chowan River Basin

(Plants operated with regulation as part of unit of 17 basic plan projects)

Joyces Mill	Dan River	650
Gorge	Dan River	2,000
Clemmons Ford	Dan River	3,600
Gaston	Roanoke River	86,000
Roanoke Rapids	Roanoke River	56,000

Total 148,250

(Plants operated independently without upstream regulation)

Gorge	Ran River	1,800
Roanoke Rapids	Roanoke River	56,000
		57,800

Tar River Basin

(Installations part of coordinated scheme of development for this river consisting of 2 flood control reservoirs, 2 power reservoirs and 2 navigation locks and dams.)

Sapony Creek	Tar River	6,700
Tarboro	Tar River	5,630

Total 12,330

(If power development alone is considered there are four (4) possible developments, assuming regulation from coordinated operation.)

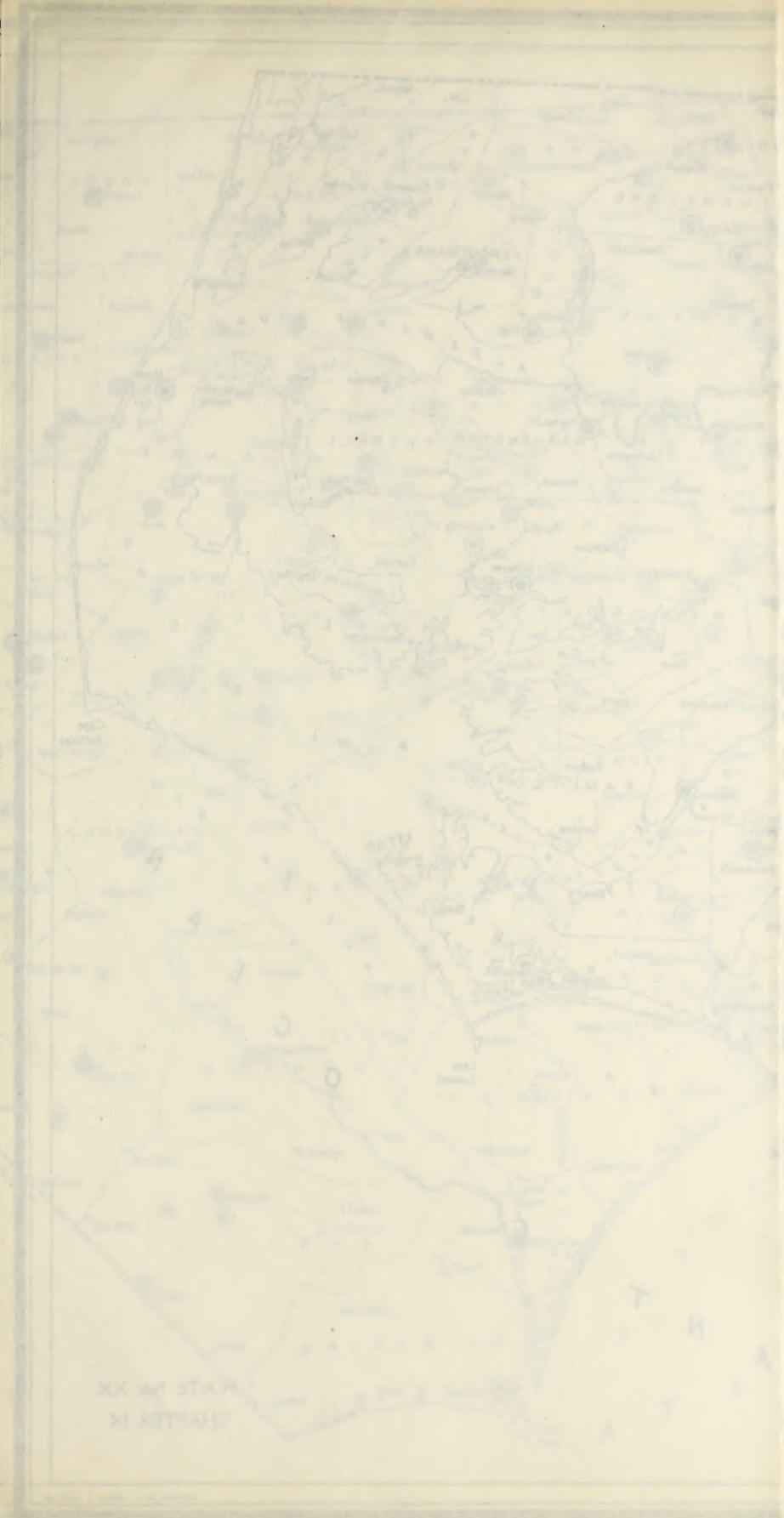
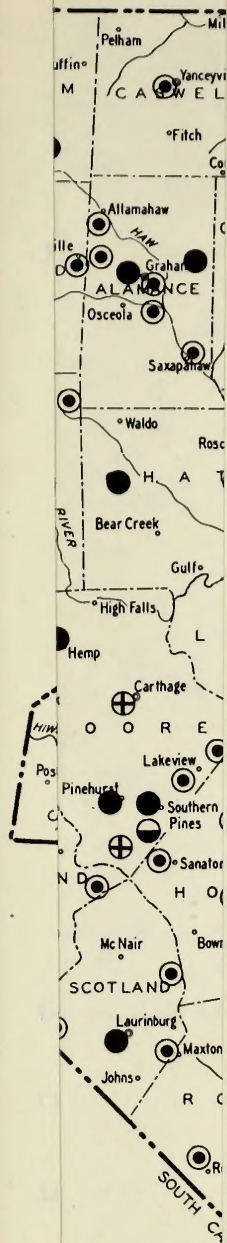
Fishing Creek near Meltons Bridge
Tar River below Webb's Bridge
Tar River at mouth of Sapony Creek
Tar River at Tarboro
Plants would develop 8,690 H.P. primary power
56,799,800 Kwh primary power } Annually
14,156,344 Kwh secondary power }

Neuse River Basin

(Projects as part of coordinated scheme of power and flood control development including also two additional purely flood control projects: Wiggins Mill on Contentnea Creek, and Bakers Mill on Little River.)

Falls	Neuse River	14,750
Milburnie	Neuse River	12,750
Wilson Mills	Neuse River	11,400
Smithfield	Neuse River	12,050

Total 50,950



the most comprehensive and valuable sources of information on potential water power and the following table is based on their conclusions.

TABLE XLII

SUMMARY OF POTENTIAL WATER POWER DEVELOPMENT IN NORTH CAROLINA—CAPACITIES EXPRESSED IN HORSE POWER

Cape Fear River Basin

(Independent Operation)

Bynum	Haw River	39,600	
Moore's Mill	Haw River	30,000	
Mandale	Haw River	30,000	
New Hope	Haw River	45,000	
Smiley Falls	Cape Fear River	31,900	
Total			176,500

Roanoke-Chowan River Basin

(Plants operated with regulation as part of unit of 17 basic plan projects)

Joyce's Mill	Dan River	650	
Gorge	Dan River	2,000	
Clemmons Ford	Dan River	3,600	
Gaston	Roanoke River	86,000	
Roanoke Rapids	Roanoke River	56,000	
Total			148,250

(Plants operated independently without upstream regulation)

Gorge	Ran River	1,800	
Roanoke Rapids	Roanoke River	56,000	
		57,800	

Tar River Basin

(Installations part of coordinated scheme of development for this river consisting of 2 flood control reservoirs, 2 power reservoirs and 2 navigation locks and dams.)

Sapony Creek	Tar River	6,700	
Tarboro	Tar River	5,630	
Total			12,330

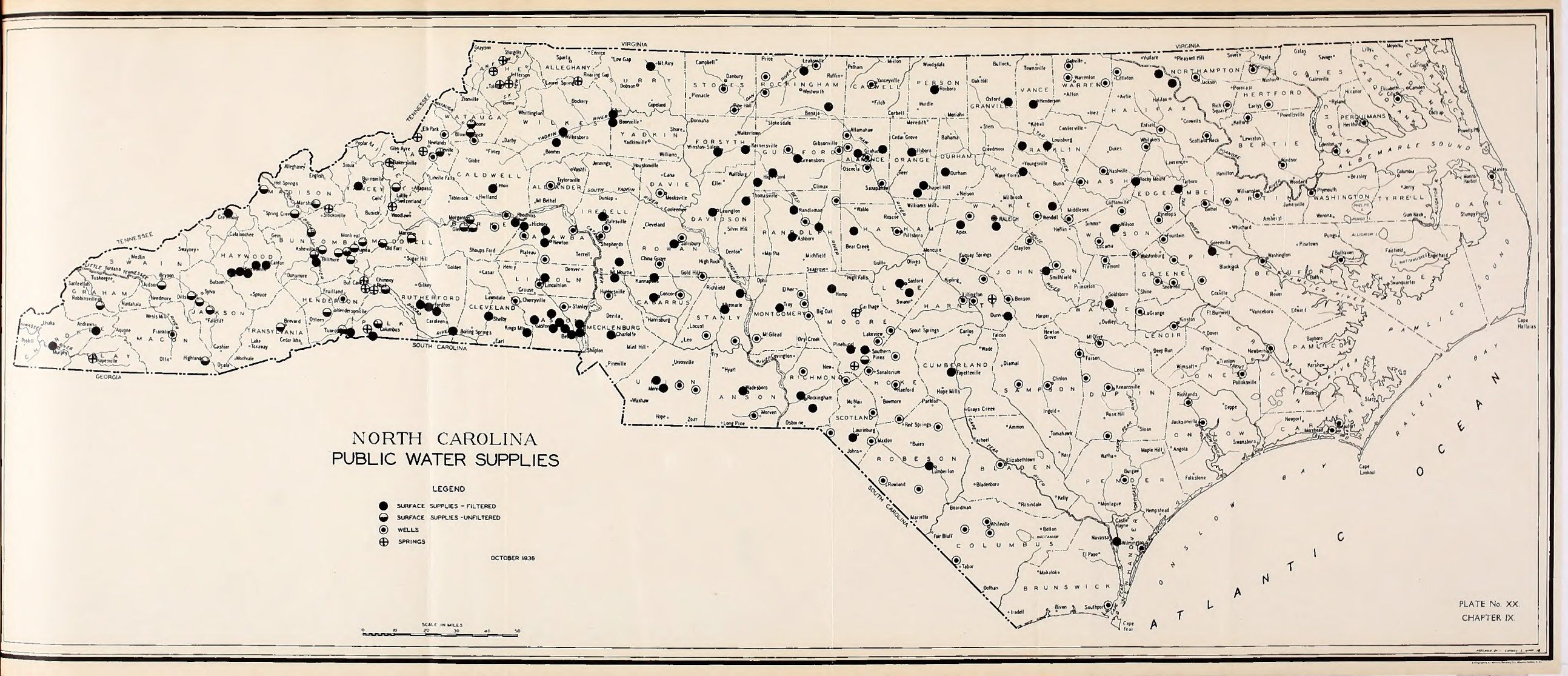
(If power development alone is considered there are four (4) possible developments, assuming regulation from coordinated operation.)

Fishing Creek near Meltons Bridge
 Tar River below Webb's Bridge
 Tar River at mouth of Sapony Creek
 Tar River at Tarboro
 Plants would develop 8,690 H.P. primary power
 56,799,800 Kwh primary power } Annually
 14,156,344 Kwh secondary power }

Neuse River Basin

(Projects as part of coordinated scheme of power and flood control development including also two additional purely flood control projects: Wiggins Mill on Contentnea Creek, and Bakers Mill on Little River.)

Falls	Neuse River	14,750	
Milburnie	Neuse River	12,750	
Wilson Mills	Neuse River	11,400	
Smithfield	Neuse River	12,050	
Total			50,950

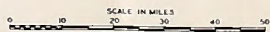


NORTH CAROLINA
PUBLIC WATER SUPPLIES

LEGEND

- SURFACE SUPPLIES - FILTERED
- SURFACE SUPPLIES - UNFILTERED
- ⊙ WELLS
- ⊕ SPRINGS

OCTOBER 1936



(If power development alone is considered, which is not justified economically, then all six sites are developed for power.)

Falls	Neuse River	21,400
Milburnie	Neuse River	21,400
Wilson Mills	Neuse River	29,500
Smithfield	Neuse River	14,700
Bakers Mill	Little River	4,280
Wiggins Mill	Contentnea Creek	2,410
		<hr/>
		93,690

Yadkin River Basin

Correlated System, without flood control

Major Projects

Wilkesboro	Yadkin River	23,320
Styres	Yadkin River	32,850
Junction	Yadkin River	37,850
Cooleemee	South Yadkin River	12,800
Loves Ford	Rocky River	7,430
Crumps Ford	Rocky River	26,500
Greater Blewett Falls	Pee Dee River	126,500
Morven	Pee Dee River	50,900
		<hr/>

Total

318,150

Independent Projects, without flood control

Major Projects

Wilkesboro	Yadkin River	23,320
Styres	Yadkin River	27,380
Junction	Yadkin River	25,960
Cooleemee	South Yadkin River	12,800
Loves Ford	Rocky River	7,430
Crumps Ford	Rocky River	25,550
Greater Blewett Falls	Pee Dee River	69,600
Morven	Pee Dee River	21,650
		<hr/>
		213,690

Independent Operation, without flood control

Minor Projects

Elkin	Yadkin River	14,350
Donnaha	Yadkin River	46,650
Uharie	Uharie River	4,000
Nances Ford	Rocky River	7,000
Martins Bridge	Little River	8,500
		<hr/>

Total

80,500

Catawba-Broad River Basin

Coordinated System, without flood control

Major Project

Clinchfield	Broad River	24,350
		<hr/>

Total

24,350

Minor Project

Lincolnton	South Fork Catawba	
Primary discharge, project storage 330 second-feet		
Capacity discharge, 1000 second-feet Area reservoir, 11,100 acres		

GRAND TOTAL

730,530

NAVIGATION

From time to time navigational improvements such as dredging, channel deepening and straightening, locks and dams, etc., have been made on North Carolina streams by the U. S. Army Engineers, as approved and authorized by Congress. River navigation

improvements in this State have been confined to the streams emptying into the Sounds or Atlantic Ocean within the borders of the State: namely, the Roanoke, Chowan, Meherrin, Tar, Neuse, and Cape Fear rivers. The portions of the Yadkin, Catawba and Broad rivers lying in North Carolina are not considered navigable, and no improvements for this purpose have been made on them. Similarly, the streams of the western basins, or Ohio River drainage in North Carolina, are not navigable and have received no improvements.

The status of the navigable portions of the streams and channels in the State, as of June, 1936, is summarized below.

PRINCIPAL RIVERS

Meherrin River

Depth of 10 feet and width of 100 feet available from mouth to Murfreesboro, 12½ miles. Above Murfreesboro probable controlling depth of 3 feet to Skinners Landing.

Chowan River

Navigable for entire length of 50 miles between Albemarle Sound and confluence of Nottoway and Blackwater rivers. Controlling depth of 12 feet between the Sound and mouth of Meherrin River, and controlling depth of 9 feet between mouth of Meherrin River and confluence of Blackwater and Nottoway rivers.

Roanoke River

Controlling depth of 6 feet between mouth and Hamilton, 62 miles. Controlling depth of 3 feet between Hamilton and Weldon, 67 miles. Not navigable above Weldon.

Pamlico and Tar Rivers

Controlling depth of 10½ feet from mouth of river to Washington. Above Washington controlling depth of 6 feet to a point 11 miles below Greenville; 4 feet to a point 3 miles below Greenville; 2.6 feet to Greenville, and thence 1 foot to the mouth of Fishing Creek.

Neuse River

Channel 300 feet wide with controlling depth of 12 feet exists from mouth to New Bern. Controlling depth of 4 feet from New Bern to a point 23 miles above; thence 2½ feet to mouth of Contentnea Creek, 32 miles above; thence 1 foot to Seven Springs, 75 miles above New Bern.

Cape Fear River

A channel 27 feet deep exists over the ocean bar, and channel 30 feet deep from the mouth to Wilmington. Controlling depth of 19 feet from Wilmington to a point 9 miles above; thence controlling depth of 9 feet to Fayetteville, head of navigation, 115 miles above Wilmington.

OTHER IMPROVEMENTS

Intracoastal Waterway

Controlling depth of 12 feet from Norfolk, Va., to Beaufort, N. C., thence 12 feet to Wrightsville Causeway, thence 10½ feet to the Cape Fear River. Controlling depth of 8 feet between Cape Fear River and Little River, South Carolina.

Waterway Connecting Swan Quarter Bay with Deep Bay, N. C.

A channel 6 feet deep at mean low water and bottom width of 50 feet exists throughout the Waterway.

Belhaven Harbor, N. C.

A channel 12 feet deep at mean low water to Belhaven, N. C., from the Inland Waterway, Norfolk, Va., to Beaufort Inlet, N. C.

Far Creek, N. C.

A channel 7 feet deep at mean low water to Englehard.

Rollinson Channel, N. C.

A limiting low water depth of 4 feet.

South River, N. C.

A controlling mean low water depth between the mouth and Aurora of 7 feet.

Silver Lake Harbor, N. C.

The project depth of 5 feet at mean low water in the entrance channel.

Bay River, N. C.

The controlling mean low water depth of 8 feet to Bayboro, 16 miles above the mouth, and the practical head of navigation.

Swift Creek, N. C.

A channel 5 feet deep at mean low water with a minimum width of 50 feet from the mouth to Vanceboro.

Smiths Creek (Pamlico County), N. C.

A mean low water depth of 8.5 feet at the entrance with a depth of 8 feet in the harbor.

Contentnea Creek, N. C.

This stream obstructed by a shoal at its mouth and in poor condition.

Trent River, N. C.

A channel 12 feet deep at mean low water and 300 feet wide exists at New Bern, a channel 6 feet deep at dead low water to Pollocksville, 18 miles above, thence a channel with controlling depth of 3.5 feet to Trenton, 38 miles above, and the head of navigation.

Channel Connecting Thoroughfare Bay with Cedar Bay, N. C.

A controlling low water depth of 4½ feet.

Beaufort Harbor, N. C.

Controlling depths as follows: Gallants Channel, 11½ feet; Bulkhead Channel, 12 feet; channel in front of Beaufort, 12 feet.

Waterway Connecting Pamlico Sound and Beaufort Harbor, N. C.

A project depth of 7 feet at mean low water.

Waterway to Jacksonville, N. C.

A controlling depth of 5 feet from the Intracoastal Waterway to Jacksonville.

Morehead City Harbor, N. C.

A channel 12 feet deep at mean low water in Beaufort Outer Harbor to the foot of Tenth Street in Morehead City, and thence a channel 6 feet deep at mean low water connecting the western end of the harbor with Bogue Sound. The channel from the inlet to the marine terminals has a mean low water depth of 30 feet.

Beaufort Inlet, N. C.

A controlling mean low water depth of 30 feet.

Harbor of Refuge, Cape Lookout, N. C.

A controlling depth at the harbor entrance of 42 feet.

Northeast (Cape Fear) River, N. C.

Controlling low water depths of 15 feet to a point $2\frac{3}{4}$ miles above the mouth; thence 6 feet to Bannerman's Bridge, 48 miles above the mouth; and thence 3 feet to Crooms Bridge, 56 miles above the mouth.

Black River, N. C.

Controlling low water depths of 5 feet to Point Caswell, 24 miles above the mouth, $2\frac{1}{2}$ feet to Hawes Narrows, 32 miles above mouth, and $1\frac{1}{2}$ feet to Clear Run, the head of navigation, 66 miles above the mouth.

Shallotte River, N. C.

Controlling mean low water depth of $3\frac{1}{2}$ feet to the town of Shallotte, 9 miles above the mouth and the head of navigation.

Smiths Creek, Wilmington, N. C.

Controlling mean low water depth of $7\frac{1}{2}$ feet.

POLLUTION

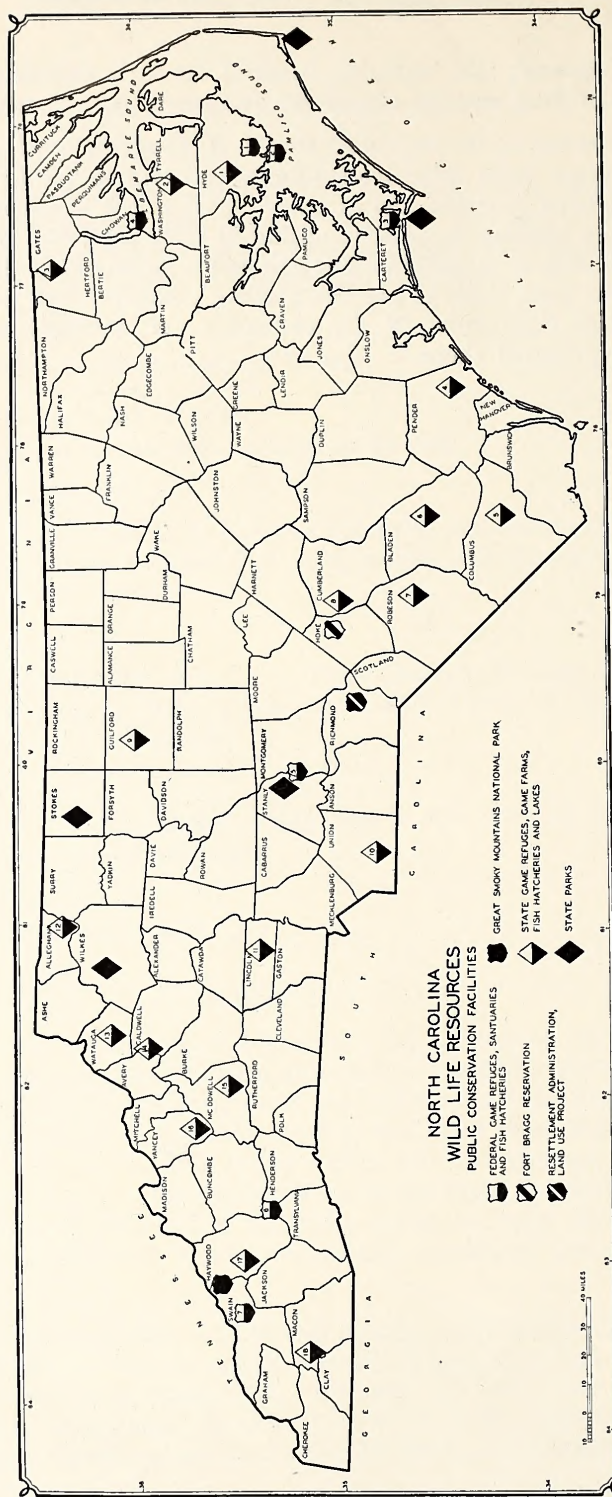
Pollution of our streams and rivers is becoming an increasing nuisance in North Carolina. There are numerous towns and municipalities emptying sewage, both treated and untreated, into the rivers and streams of the various drainage basins. In addition to sewage, there are a number of textile processing mills and other industrial establishments emptying dye and other types of trade wastes into the streams. Particularly is this true in the Piedmont and upper Coastal Plain areas where industries are more centralized. The concentration of polluting materials serves to make the streams waste-disposal units which in some cases become particularly objectional during periods of low stream flow.

Another factor, erosion of soils, contributes largely to the pollution of the streams. It has been estimated that the silt yield of the coastal streams is as high as 0.25 acre feet per annum per square mile of drainage area. Although this value may not be excessive in comparison with the silt pollution of some other rivers in the United States, still it is enough to give a muddy, turbid appearance to the Piedmont and Coastal Plain streams.

It is a matter of interest that historical notes of the early part of the past century describe the waters of these streams and rivers as exceptionally clear and sparkling.

The Soil Conservation Service, under the U. S. Department of Agriculture, has for the past several years made extensive studies of soil erosion and its related subjects, in Guilford and Randolph counties, and at other places in the Piedmont section. A great deal of information relating to erosion, silting in reservoirs, etc., has been collected by this agency, in addition to valuable aid and assistance rendered to the farmers in properly terracing their farm lands to prevent further erosion. The central office of this agency is located at High Point, N. C., and additional information desired about their program may be procured there.

PLATE XXI



CHAPTER X

WILDLIFE RESOURCES

North Carolina continues to rank as one of the foremost States in the Union in abundance and variety of wildlife. Climate, topography of the land, the fact that the State remains predominantly agricultural, vast acreages of forest lands, enormous bodies of fresh and salt water, numerous rivers and streams of uniformly high physical characteristics—all combine to form ideal conditions for the production of all species of fish and game native to the temperate zone. To these favorable natural conditions has been added, in recent years, the aid of one of the country's most comprehensive game programs, administered by the Division of Game and Inland Fisheries, North Carolina Department of Conservation and Development.

Realizing that regulatory measures alone were inadequate to halt wildlife depletion, and that restrictions have within themselves no power to restore where reductions have taken place, the wildlife program now operating in North Carolina includes, in addition to certain game laws, extensive facilities for restoration and permanent care of wildlife. Definitely connected with land use in its modern application, the wildlife resources of North Carolina are of such importance as to merit the attention of all conservation agencies in the State. The National Forests, the National Park, State Parks, Soil Conservation Service, and the activities of several Federal Relief bodies in North Carolina now embrace in their activities projects having to do with wildlife resources.

The participation of these agencies concerned primarily with land use, and greatly expanded facilities for wider operations on the part of regular established channels, have assured enlargement and perpetuation of the State's valuable wildlife resources.

Private co-operation and enterprise have been important factors in the success of the wildlife program in this State. Individuals and groups of sportsmen have set up large hunting preserves and refuges throughout the State. Upon these lands, both leased and owned, protection, management and actual propagation activities are carried on.

WESTERN NORTH CAROLINA GAME REFUGES

The Western North Carolina Game Refuges are recognized all over the nation as being outstanding developments of this type. These areas are of such significance to the State Wildlife Program that special attention is given to the work being done here in this survey.

Mt. Mitchell State Game Refuge: Located at the headwaters of the Toe River in Yancey County, this refuge was established November 1, 1927, on Pisgah National Forest, State, and privately owned lands. The refuge borders for a distance of eleven miles on the county lines of McDowell and Buncombe counties. The division of lands is as follows: Pisgah National Forest, 14,376 acres; State Park, 1,224 acres; State Division Lands, 167 acres; and private lands, 233 acres—a total of 16,000 acres in the refuge.

The refuge boundary is marked by a cleared strip and all entrances are posted. Dogs, guns, and traps are not permitted.

The total stream mileage within the refuge amounts to 40 miles, all well stocked with rainbow and speckled trout. In addition to this stream mileage, some 30 or 35

miles of Curtis Creek, and tributaries, lying partly in the refuge, are now being stocked with trout. Fishing is permitted in the refuge during certain open days in the year.

The refuge operates a cold water hatchery in connection with the work at the game farm; however, production from this hatchery is at present very limited.

Game wardens patrol the entire refuge area, exterminating predators, maintaining regulations, and exercising management of all game upon the range.

Through such a program as that instituted upon the Mt. Mitchell Refuge, constant restocking of the entire area adjacent to the refuge is obtained. The improved conditions are reflected in the large tracts of land in this locality given over to privately-owned public shooting grounds, the outstanding lands set aside for this purpose being 13,000 acres in the Big Tom Wilson Tract and 5,000 acres in the Threadgill Boundary. Approximately 75,000 acres of the Pisgah National Forest lands adjacent to the refuge constitute public hunting grounds.

Daniel Boone Refuge: This refuge is located on the eastern slopes of Grandfather Mountain in Avery and Caldwell counties. It contains 16,000 acres of land, 33 miles of streams, and has some 65,000 acres of National Forest lands lying adjacent as public hunting grounds. Operations here are very much the same as those conducted at the Mt. Mitchell Refuge.

Wayah Bald State Game Refuge: This is the smallest of the three refuges, and is located in Macon County on Nantahala National Forest, State, and private lands. The total area covers 9,909 acres.

Approximately 132,000 acres of National Forest lands adjoin the refuge and constitute public hunting grounds.

The following table is based on an estimate on game and fish on the Western North Carolina State Game Refuges in 1935:

TABLE XLIII

Kind of Game	Mt. Mitchell Refuge	Daniel Boone Refuge	Wayah Bald Refuge	Totals
Deer	350	40	75	465
Elk	7	6		13
Bear	45	15	2	62
Raccoon	600	500	175	1,275
Opossum	300	400	150	850
Squirrel	1,600	1,200	650	3,450
Rabbits	800	850	250	1,900
Mink	50	60	12	122
Muskrat	30	50	10	90
Turkey			50	50
Ruffed Grouse	800	600	300	1,700
Pheasant	50	12	15	77
Quail	150	200	200	550
Fish over 6" (trout)	12,000	9,000	2,250	23,250

Further facilities for the propagation and conservation of wildlife, including aquatic and bird life, will be discussed in brief surveys covering the resources by groups.

UPLAND GAME BIRDS

In North Carolina, this group includes quail, wild turkey, dove, ruffed grouse and pheasants.

Quail: More people hunt quail in this State than the combined numbers of those who hunt the other upland game birds. In fact, the quail ranks second to the rabbit in the number of hunters attracted.

With ideal climatic conditions and adequate food and cover, almost the entire State constitutes excellent range for the quail. In fact, North Carolina is generally credited with being one of the most favored of all states for this game bird, and has a national reputation for its excellent quail shooting. The heaviest concentrations are in the Piedmont section, especially in Guilford, Forsyth, Iredell, Randolph, Davidson, Chatham, Montgomery, Rockingham, Stokes, Anson, Mecklenburg and Wake counties. Although there are large stocks of birds in most of these counties, in all probability there are equal numbers in several eastern counties. Ashe and Buncombe counties in the west, and Halifax, Johnston, Beaufort, and several other counties of the east furnish good shooting. Many non-resident hunters maintain large shooting preserves in some of the counties named.

Although the State operates a quail farm adjacent to the Frank Stedman Fish Hatchery in Cumberland County, and some propagation is done on Game Preserves, natural reproduction of quail is chiefly relied upon. The present trend toward game management on the farm, and especially of this species of game bird, will, in all probability, make artificial propagation on a wide scale unnecessary.

The abundance of quail, particularly in the Piedmont, has been responsible for the establishment of a number of hunting clubs and preserves, which are visited each year by large numbers of famous hunters from this and other states. Many farmers of this section are deriving a considerable income from the practice of leasing lands, containing cover and good feeding conditions, to these hunters.

Depletion of quail in North Carolina is localized in regions where repeated fires, uncontrolled predators, and lack of interest on the part of landowners exist. Conditions generally over the State are good.

Wild Turkey: A definite program instituted by the State Division of Game and Inland Fisheries has been set up to rehabilitate the supply of wild turkey in North Carolina. In addition to intensive work at the game farms, operated in connection with refuges, the Division proposes to select suitable wilderness areas throughout the State and to conduct natural breeding experiments, based upon the reasonable assumption that birds produced in this manner will remain wild and not become domesticated by contact with points of human habitation.

The original range of the wild turkey was virtually the entire State. Today, birds are found in fairly large numbers only along the Roanoke, Pamlico, and Neuse rivers; in several counties of the southeastern part of the State; in Chatham, Caswell and Randolph counties in the Piedmont; and upon the Pisgah National Game Refuge in the mountains.

North Carolina, even with its depleted stock, is one of the best wild turkey regions in the United States. Between three and five thousand birds are taken in this State annually.

Dove: Like the quail, dove occupy a large range in North Carolina. The supply remains fairly equal from year to year, furnishing good hunting for large numbers of resident and non-resident sportsmen. The heaviest concentrations are in the Coastal Plain and Piedmont Region.

Ruffed Grouse: The ruffed grouse is native to the mountain section of North Carolina. Once near complete exhaustion, protection and extensive propagation operations have built up the stock until today, several western counties are inhabited by large numbers of grouse. Ashe, Watauga, Yancey, Jackson, and Macon counties supply the best shooting.

Pheasants: This is an imported game bird and efforts to stock various sections of the State have met only with fair success. Hunting of the pheasant is not allowed in North Carolina.

BIG GAME SPECIES

Deer: Deer is the most popular, and considered by many the most important of all North Carolina big game animals. The importance attached to this big game species is manifest in the fact that North Carolina has some 200,000 acres of land, controlled by State and Federal governments, upon which production and conservation of deer has become a major activity.

Pisgah Federal Game Preserve: The Pisgah Game Preserve covers 98,000 acres of western North Carolina mountain lands. Although the game being restocked includes bear, wild turkey, grouse, squirrel, raccoon and all species of native furbearers, the principal activity consists in restocking deer.

The necessity for intensive restocking and protection in western North Carolina is clearly shown by the fact that a complete closure of the open season for hunting deer has been effected in a number of counties.

The rehabilitation of deer, however, is progressing rapidly within the mountain area. In fact, development upon the Preserve has been so rapid as to necessitate declaring open dates for hunting, two hunts having been held in order to prevent deer from reaching proportions too great for their own welfare.

The success of the Pisgah Federal Game Preserve and that attending the work of the Western North Carolina State Game Refuges makes the outlook for restocking the entire mountain area most hopeful.

Fort Bragg Refuge: The outstanding example of successful game management, deer restocking in particular, is afforded in the results obtained upon the Fort Bragg Refuge, a project undertaken solely by the Military Post, and carried out upon the lands of the great Artillery Reservation in the Sandhills of North Carolina.

The overflow of deer from this reservation and the restocking work being carried on upon private hunting preserves maintains a supply of this big game animal in this region.

Holly Shelter State Game Refuge: This refuge, operated by the State Division of Game and Inland Fisheries, covers 60,000 acres. Although bear, and quail and other small game are present in abundance, the wilderness swamp areas of the refuge furnish ideal conditions for natural reproduction and protection of large numbers of deer.

On the whole, the eastern part of North Carolina presents no particular problem, excellent range being found for large numbers of deer in Gates, Halifax, Beaufort, Tyrrell, Dare, Washington, Pamlico, Craven, Brunswick, Bladen, Bertie, Onslow, Pender, Martin, and several other counties of this section. Over three thousand male deer are taken in this section each year. Shooting of does is prohibited in all sections of North Carolina.

Bear: In eastern and western North Carolina, bear inhabit practically the same range as deer. The swamps of the eastern part of the State contain large numbers of this big game animal, while the lands adjacent to refuges in the mountains are well supplied. The open season in the east usually extends about 20 days longer than that set for the mountain region.

Wild Boar: This distinctive type of game was introduced in Graham County in extreme western North Carolina over a score of years ago. The range remains largely restricted to this county, no efforts having been made to breed the animal elsewhere in the State. Wild Boar hunting in Graham County is receiving recognition from sportsmen in many parts of the country.

Elk: There are only a few elk in the State today, the number being confined entirely to the Western North Carolina State Game Refuges.

FURBEARERS

The State Game law classifies the following species as furbearers: muskrat, raccoon, opossum, beaver, mink, otter, wildcat, and skunk. There is no closed season on wildcat, weasel and skunk. The State allows county regulation of the taking of fox.

Muskrat, raccoon, opossum and skunk are found in fairly large numbers in all sections of the State. Mink, otter and beaver are depleted, the last named species being almost, if not quite, extinct. There is no open season on beaver in North Carolina.

The fox is found in large numbers in many sections of the State. Fox hunting in the Sandhills, in the Piedmont, and in the mountain area around Tryon, in Polk County, attracts large numbers of sportsmen each year.

While the State operates no farm for the propagation of furbearers, other than the work done in connection with the refuges, there are several fur farms in the State where silver fox are bred and raised in considerable numbers. These farms are located in the mountain section in Henderson County.

North Carolina produces many excellent pelts and skins for market, the total value amounting to some \$2,000,000 annually.

MIGRATORY WATERFOWL

During the fall and winter practically all species of migratory waterfowl found along the Atlantic Coast visit North Carolina's large sounds and lakes. Quite a number of

ducks and geese winter on the larger power lakes in the Piedmont region and in the mountains. Included are eight to ten varieties of ducks, several members of the goose family, brant, coot, gallinule, rail, snipe, and woodcock.

Currituck, Roanoke, Croatan, Pamlico, Bogue, and Core Sounds, and Great Mattamuskeet Lake furnish some of the best wintering quarters for migratory waterfowl on the entire Atlantic Coast, and are visited by many thousands of birds each year.

Feeding conditions, seriously damaged several years ago, are now greatly improved in these areas, and species, which are depleted at other points along the coast, seem to be fairly plentiful here.

The activities of the Federal Government in administering laws affecting migratory waterfowl with greater restrictions enforced, extensive research work in regard to breeding grounds, flyways, banding, improving feeding conditions, and the establishing of waterfowl sanctuaries, have all been instrumental in bringing about a program which it is hoped will maintain the supply on a constant level, stop depletion, and eventually result in some increase in the number of waterfowl. The Federal Regulations governing waterfowl are automatically the statutes of the various states visited by wildfowl.

One of the largest sanctuaries in the east was assured for migratory waterfowl with the purchase by the U. S. Government of Mattamuskeet Lake in Hyde County. This great body of water, some 50,000 acres in extent, furnishes exceptionally fine conditions for great numbers of ducks, geese and swan—the last bird named being protected from shooting. Shooting of ducks and geese over certain restricted areas of Mattamuskeet Lake is permitted under Federal regulations.

The total economic value of migratory waterfowl to North Carolina amounts to a very considerable sum of money, counting expenditures made for room and board given hunters, sale of hunting equipment, guide and dog hire, transportation costs, etc., but no accurate estimate can be made.

GAME FISH

The program to preserve an abundance of game fish in North Carolina has kept pace with the efforts to increase and maintain the supply of other forms of wildlife.

The Division of Game and Inland Fisheries, North Carolina Department of Conservation and Development, is operating six hatcheries for the propagation of fresh water game fish. Five of these hatcheries—Murphy, Morrison, Roaring Gap, Boone, and Toe River—are producing cold water species, such as brown, speckled, and rainbow trout, and small mouth bass. The Stedman Hatchery produces warm water species, principally the large mouth bass and bream.

The production from these hatcheries will be greatly augmented by hatcheries constructed by the Federal Government in the Great Smoky Mountains National Park and in the submarginal land area in the Sandhills, the latter development being a project of the Resettlement Administration.

The hatchery in the National Park was constructed by the U. S. Bureau of Fisheries on the North Carolina side of the Park at Kephart Prong. The rated capacity of the hatchery is a half million trout annually. The output will be placed in streams within the boundaries of the National Park and the Pisgah National Forest.

It is estimated that nearly 4,000,000 game fish of warm water species will be produced in the Hoffman Hatchery in Richmond County. Fish from this hatchery will be distributed in the waters of the purchase area, and into streams upon adjacent lands.

COLD WATER SPECIES

This group of game fish, found in the western mountain section of the State, includes trout, muskellunge, small mouth bass, bream, perch, and several minor species.

The waters of lakes and streams in this area are well suited for the species named. Stream conditions are generally excellent, except for pollution in a few restricted rivers.

Trout: In the mountains, the trout is king. The brook, or speckled trout, is native to and thrives in the colder waters of the high altitudes. Rainbow and brown trout are found in streams at lower elevations.

Fishing has become so heavy in mountain streams of recent years that a continued supply of all species will doubtless depend, to a great extent, upon artificial restocking. In waters where demands are not so heavy, natural reproduction appears sufficient to stock the waters.

Operating at maximum capacity, the hatcheries producing trout turn out over 3,000,000 fish each year. Adding the considerable number of fish from natural reproduction, there is little danger that trout waters will ever be "fished out."

Muskellunge: At present, this northern game fish species is found in North Carolina only in the Tennessee and French Broad rivers. There are, however, some 150 miles of streams in this State, now supporting small mouth bass, which are considered good for muskellunge. These waters, besides the Tennessee River already mentioned, are the Tuckaseegee and Cheoah rivers and several lakes in the area.

Numerous lakes and streams at the lower mountain elevations are inhabited by both large and small mouth bass, bream, perch, and other species of game fish.

Lake Santeetlah, Lakes James and Rhodhiss, and Lake Tahoma are all favorite fishing grounds. Outside of the excellent fishing streams in the National Forests and in the State Game Refuges, there are other waters well known to anglers. One of the principal grounds for trout fishing in the mountains lies in Elk River, (leased), in Avery County.

Combining stream mileages on National Forest lands and in State Refuges, there are some 500 miles of water on public lands available for angling during designated open days.

WARM WATER SPECIES

The principal species belonging to this group include large mouth bass, striped bass, bream, and a variety of perch and other members of the sunfish family. These warm water species are found in all fresh water capable of supporting fish, east of the mountain region to the coast.

In view of the fact that producing waters are so extensive in the Piedmont and Coastal regions, and that spawning areas, particularly in waters below the Fall Line, are in excellent condition, the brunt of stocking the various species has been and will

continue to fall on natural reproduction. To facilitate the success of this program, the State has recently adopted a program whereby sections of rivers and their tributaries where spawning areas are extensive are closed to fishing for a period. This procedure has been highly successful in waters thus closed, and has resulted in general improvement extending outside the restricted areas. It is expected that this program will be made permanent, and will in time include all waters needing restocking of warm water game fish.

Large Mouth Bass: This great game fish is distributed more generally and is found in greater abundance in the warm waters of North Carolina than any other major species. Experienced sportsmen are authorities for the statement that eastern North Carolina waters provide some of the best bass fishing in the country. Specimens from six to eight pounds are not uncommon.

The following waters contain large mouth bass in abundance: North River, Currituck and Camden counties; Alligator River and tributaries, Dare and Tyrrell counties; Lake Phelps, Washington County; tributaries of the Pamlico River, Beaufort County; tributaries of the Neuse River, Craven County; Trent River, Jones County; New River, Onslow County; and tributaries of the Cape Fear River in New Hanover, Brunswick and other counties.

For the past few years, Mattamuskeet Lake in Hyde County has been overstocked with a distinctive type of bass having the characteristics of the Kentucky bass, and different in some respects from the large and small mouth species. Crappie and white perch are also numerous in this lake. Although it is a Federal Migratory Waterfowl Sanctuary, administration of fishing privileges in this body of water has been turned over to the North Carolina Department of Conservation and Development.

Striped Bass: Striped (rock) bass fishing is at its best in North Carolina. Although some depletion has been noticed, the Roanoke River is one of the most important spawning grounds in the country. This migratory game fish enters the sounds and Pamlico, Neuse, Cape Fear and other rivers in large numbers. Fish are taken in these waters, weighing from 60 to 75 pounds.

Other Warm Water Fish: The bream, perch, and other members of the sunfish family are found in lakes, private ponds, and rivers over the Piedmont and Coastal sections. These species supplement the sport of bass fishing, and for some provide the major feature of an outdoor excursion.

Although excessive soil erosion and pollution have removed some waters from production, the physical qualities of the streams and lakes, in general, are good. Soil conservation activities in the Piedmont will doubtless, in time, reduce the high turbidities of some waters, thus allowing them to be restocked with game fish.

Fluctuating water levels in the Piedmont power dams do not allow extensive spawning, and for this reason, artificial stocking is needed to supplement the normal production of fish.

SALT WATER SPECIES

The sounds, mouths of large rivers, and the Atlantic Ocean bordering the coast of North Carolina are all inhabited by an abundance of salt water game fish. The principal

species include the Channel bass (red drum), cero, bluefish, seatrout, dolphin, amberjack, mackerel, pompano, sheepshead, and croakers. The tarpon is taken during some of the summer months by parties properly equipped for, and familiar with, this type of fishing.

The channel bass waters of North Carolina are considered the finest on the Atlantic Coast. Oregon Inlet is the best known fishing ground for this species. Hatteras, Ocracoke, Drum Inlet, Brown's Inlet, Topsail Inlet and New River Inlet are also popular grounds. Specimens ranging up to 75 pounds are numerous in these waters.

The best season for fishing the northern inlets is in the months of April, May and June. Catches, however, are made through the summer and into October and November.

Bluefish, seatrout, mackerel, pompano and croakers are taken in the river mouths, sounds, and all up and down the entire coast.

One of the most popular deep sea species on the North Carolina Coast is the cero, or kingfish. Great concentrations of this powerful game fish, specimens weighing from 15 to 30 pounds and larger, are found in the vicinity of Morehead City and Beaufort.

Dolphin and amberjack are taken consistently off Cape Hatteras and Cape Lookout, where the gulf stream makes its nearest approaches to the mainland. This warm current, with its vast wealth of tropical fish life, reaches within a score of miles of these capes.

NON-GAME SPECIES OF BIRDS AND WILDFOWL

The life zones and bird distribution in North Carolina follow fairly well defined lines of topography and season. These life "zones", though merging into one another gradually and not abruptly, are defined in North Carolina as follows: Canadian Zone, Alleghanian or Transition Zone, Carolinian or Upper Austral Zone, and Lower Austral or Austro-riparian Zone.

These various zones, and the principal species of birds found in each, are described by C. S. Brimley, Co-author with T. Gilbert Pearson and H. H. Brimley of *Birds of North Carolina*, a publication of the North Carolina Geological and Economic Survey in 1919.

The following extracts are taken from this work:

"The Canadian Zone: This is the most northern of the life zones that enter North Carolina, where it occupies only the tops of the higher mountains, above 4,000 or 5,000 feet elevation. The following are birds which in the breeding season are found in this zone and not elsewhere in the State: Golden-crowned Knight, Redbreasted Nuthatch, Black-capped Chickadee, Brown Creeper, Winter Wren, Pine Siskin, Crossbill, Raven, Hairy Woodpecker, Downy Woodpecker, and Golden Eagle. The Carolina Junco is found in this zone and also in higher portions of the Alleghanian.

"The Alleghanian or Transition Zone includes that portion of the mountains below 4,000 or 4,500 feet and above 2,500 feet elevation. The principal characteristic breeding birds—are as follows: Wilson's Thrush, Bewick's Wren, Cairns' Warbler, Black-throated Green Warbler, Chestnut-sided Warbler, Blackburnian Warbler, Golden-winged Warbler, Canadian Warbler, Warbling Vireo, Scarlet Tanager, Song Sparrow, Vesper Sparrow, Baltimore Oriole, Rose-breasted Grosbeak, Least Flycatcher, Olive-sided Flycatcher and Yellow-bellied Sapsucker.

"The following birds enter the Alleghanian Zone from the Carolinian: Carolina Wren, Carolina Chickadee, Worm-eating Warbler, Kentucky Warbler, Louisiana Water-thrush, Hooded Warbler, Southern Downy Woodpecker, and Southern Hairy Woodpecker.

"The Carolinian or Upper Austral Zone: This zone occupies the mountain valleys below 2,500 feet elevation, and the greater part of the central region of the State, its eastern and southeastern limit being roughly a line drawn from Weldon to Raleigh, thence to Charlotte and on to Tryon in Polk County.

"The birds that enter this zone from the Lower Austral, but do not extend into the Alleghanian, are: Brown-headed Nuthatch, Mockingbird, Yellow-throated Warbler, Pine Warbler, Prairie Warbler, Summer Tanager, Bachman's Sparrow, Blue Grosbeak, Orchard Oriole and Black Vulture.

"The following birds do not range below into the Lower Austral, though they do range upward into the Alleghanian: Yellow Warbler, Redstart, Goldfinch, and Whip-poor-will.

"Lower Austral or Austro-riparian Zone . . . is perhaps the most sharply distinguished of the zones in this State, and as regards birds, it divides naturally into a coastal strip and an inland portion. Its upper limit is formed by the lower boundary of the Upper Austral defined above. Few land birds occur in the whole of this region which do not also enter the Carolinian Zone . . . The most characteristic land birds of this zone are the Chuck-wills-widow, Nonpareil, Swainson's Warbler, Prothonotary Warbler, and Red-cockaded Woodpecker.

"Typical aquatic and salt-marsh summer birds . . . are Marian's Marsh Wren, Boat-tailed Grackle, Fish Crow, Osprey, Oystercatcher, Piping Plover, Willet, Clapper Rail, Louisiana Heron, Egret, Snowy Egret, Little Blue Heron, Water Turkey, Florida Comorant, and Black Skimmer.

"Seasonal Distribution: . . . For convenience, therefore, it is usual to group birds as residents, summer visitors, winter visitors, transients, and stragglers.

"As residents, reference is made to those birds which are found throughout the year . . . Turkey Vulture, Carolina Wren, English Sparrow, and Mourning Dove. We should bear in mind, however, that resident birds may be residents as to species, yet not as individuals. The Robins, for example, which are with us in the winter, leave in spring for their summer homes farther north, and their places are taken by breeding birds which have wintered south of the State.

"Summer visitors occur only in summer, the term being confined mainly to birds which rear their young in the State, as the Catbird, Kingbird, and Purple Martin, but which depart in autumn.

"The name, winter visitor, applies to birds which come to this State to dwell during the colder months . . . White-throated Sparrow, Marsh Hawk, Junco.

"Transients are strictly birds of passage, and appear only in spring or fall . . . Many which are transient in the central or eastern portion of the State are summer visitors in the mountains. Among these are the Scarlet Tanager, Baltimore Oriole, and various warblers.

"A straggler is a bird which has wandered from its usual home. Among such will be found the Man-O-War Bird, White Ibis and Ani."

In North Carolina, all non-game birds are protected by law, except the following: English Sparrows, Great Horned Owl, Cooper's Hawk, Sharpshinned Hawk, Crow, Jays, Blackbirds, Starlings, and Buzzards.

It may be stated that recognition of the value of song and insectivorous birds is general throughout North Carolina. Boy Scouts, School groups, Civic clubs, the Izaak Walton League, and various farmer organizations are all interested in preserving the birds.

THE VALUE OF WILDLIFE TO NORTH CAROLINA

It is impossible to estimate, in dollars and cents, the invigorating and recreational value of wildlife in North Carolina. Any attempt to calculate this value upon a basis of numbers of hunters and fishermen in the State will fall far below the actual worth

of the resource. An analysis of this kind does not include the less tangible benefits, such as increase in the value of the land, aid to crops, and the vast amount of pleasure obtained by those who consider wildlife from a purely aesthetic point of view.

However, the relative value of hunting and fishing as a form of outdoor recreation may be shown.

Several years ago, a representative of the Southern Newspaper Publishers' Association assembled the following figures for North Carolina:

Hunters and Fishermen	385,690
Baseball Fans	193,133
Football Fans	96,566
Golfers	72,425
Tennis Players	28,970
Total Football, Golf, Tennis and Baseball Fans	391,094

These figures are most enlightening, showing as they do that the total number of people classified as players and fans in all other major outdoor sports is only slightly over 5,000 more than the number of fishermen and hunters in North Carolina.

It is possible to approximate fairly closely the yearly income to the State from game. Estimating the average expenditure per hunter and fisherman to be \$5.00—a most conservative figure—the total amount spent in the State each year by resident hunters would be approximately \$2,000,000. Expenditures made by non-resident hunters would push this total up to well over \$2,000,000.

Continuing along this line, the average number of hunters and fishermen reporting their takes does not exceed 40 per cent of the total number of persons who engage in the sport. By multiplying the number of each edible species taken by these sportsmen who made reports, by the actual market value, it is found that the value of game reported taken amounted to over \$1,000,000. It is reasonable to expect that the other 60 per cent not reporting took as much as the 40 per cent which did report. Therefore, the total value of game to the State, based upon expenditures of sportsmen and the value of game taken, would amount to some \$4,500,000.

In the light of the above facts, it would appear that the sum of money, less than \$250,000, spent in North Carolina by State and Federal agencies and private individuals for the management and conservation of wildlife, places this \$4,500,000 industry in a position of being grievously underfinanced.

The burden of responsibility for the conservation of wildlife falls, of course, upon the Division of Game and Inland Fisheries, North Carolina Department of Conservation and Development. However, an increasing amount of work toward the improvement of general conditions upon the part of National Forests, State and National Parks, sportsmen and farmers is expected. Much worthwhile work is being done by the Soil Conservation Service and the Resettlement Administration. The former agency, with projects and camps in 20 Piedmont Counties, is making extensive plantings of shrubs and trees, valuable for their production of food for game. In addition to this practice, farmers are aided in providing more adequate cover and better feeding conditions through legume crops . . . both important to the upland types of game inhabiting this region.

The Resettlement Administration, in its development of the Hoffman and Elizabethtown Land Use Projects, is establishing large game reservations and bird sanctuaries. The construction of warm water fish hatcheries and fourteen clear water lakes, to be stocked with game fish species, is being carried on.

The findings of the biological experts and technicians connected with these agencies will be invaluable to the State in developing wildlife resources upon public lands, and to the landowners in their efforts to improve game conditions upon private lands.

The State program, thus supplemented, will be equal to the task of providing opportunities for increasing numbers of people whose outdoor recreation is definitely linked with the wildlife resources of North Carolina.

CHAPTER XI

COMMERCIAL FISHERIES

From the beginning of the earliest settlements in North Carolina, commercial fisheries have played a large and important part in the development of the Coastal section. Counties bordering the Atlantic Ocean and sounds, and adjacent to the large rivers flowing into these bodies of water, have had commercial fishing as their chief occupation.

The importance of the industry as a means of furnishing occupation, is shown in the fact that some 15,000 persons are directly dependent upon the industry, employed in fishing, transporting by land and sea, handling on shore, in establishments preparing the catch for market, and in marketing.

Employment in commercial fisheries and related industries for 1934, is given in the U. S. Bureau of Fisheries Report of that year:

Fishermen	Related Industries
On Vessels 757	Persons Engaged
On Boats and Shore	Proprietors 104
Regular 2,620	Salaried Employees . . 21
Casual 2,012	Wage Earners
Transporting	Average for Season. 1,269
On Vessels and Boats . . . 98	Average for Year. . 465

COMMERCIAL FISHING GROUNDS

The above tabulation does not include a large body of persons engaged in numerous oyster shucking houses. Since this last report by the Bureau of Fisheries, new establishments have begun operation, raising the total number of "persons engaged."

Extending a distance of nearly 300 miles from the Virginia line to South Carolina, the coast of North Carolina furnishes a double line of commercial fishing grounds. "Inside" are the numerous sounds and large river mouths, combining to form approximately 3,000 square miles of fishing waters. "Outside" lie the waters of the Atlantic Ocean.

The abundance and variety of commercial fish are determined, to a great extent, by the characteristics of these waters. To the north lie Currituck and Albemarle Sounds, both large fresh water bodies with no permanent direct outlet to the sea. Currituck Sound produces quantities of black bass, perch, and striped bass. Black bass are, however, no longer taken commercially. Eight large rivers empty into Albemarle Sound, credited with being the largest coastal body of fresh water in the world. Two valuable species of food fish, the white shad and striped bass—both anadromous—inhabit these waters at certain seasons.

Roanoke and Croatan Sounds form natural passages between Albemarle and Pamlico Sounds, the Croatan being considered one of the best fishing grounds in the State.

Pamlico Sound is salt water, the second largest sound on the Atlantic Coast. In addition to furnishing large quantities of mullet, spot, croaker, channel bass, bluefish, sheepshead, and hog fish, the bottom of this sound in many places is ideally suited for the growing of high quality oysters.

Core and Bogue Sounds are both salt water, and are the farthest south of the larger coastal bodies of water. Bogue Sound is noted for the quantity and excellence of scallops, the yield in former years often running as high as \$200,000 annually. South of Bogue Sound, the coast is fringed virtually the entire distance to the South Carolina line

with small sounds, such as Bear, Brown, Stump, Topsail, Myrtle Grove, and Wrightsville—all of which have some form of fishing operations.

Among the most important waters for commercial fishing are the mouths of such large rivers as the Chowan, Roanoke, Perquimans, Pamlico, Neuse, New, and Cape Fear.

PRODUCTION OF FIN FISH AND SHELL FISH FROM NORTH CAROLINA WATERS

Despite improvement in equipment, such as power vessels, modernized gear, better methods of refrigeration, and increased facilities for wider distribution of the catches, the total yield of the fisheries of the State has not shown a corresponding increase during the past fifty years. This is not necessarily a reflection of the abundance or scarcity of the supply of sea products since there are many influencing factors that must be considered, the primary one being that of markets.

An examination of the total catches and values of the takes from 1918 to 1934 may be made from the following table:

TABLE XLIV

(Compiled from U. S. Bureau of Fisheries data. Expressed in thousands.)

Year	Pounds	Value
1918	210,502	\$2,979
1927	144,466	2,778
1928	141,899	2,629
1929	217,595	2,544
1930	168,939	1,837
1931	98,161	1,088
1932	86,214	827
1934	163,462	1,762

While the catch of some species has declined steadily during this period, others have been taken in as great abundance as formerly. Storms in recent years destroyed many boats and much fishing gear which the fishermen have been unable to replace, thus cutting down the size of the catches. Other factors have been extremely low prices and restricted demands for sea foods, influences which have forced fishermen to curtail operations. Even in view of these facts, in recent years there has been considerable waste of sea foods through spoilage as the fishermen were not able to dispose of hundreds of thousands of pounds of fish.

The depression, of course, influenced the figures for 1930, 1931 and 1932, both in regard to the catch and the value. Activities connected with the menhaden, oyster, and shrimp industries were especially depressed during this period. While a return to normal business conditions is expected to relieve the menhaden, oyster, and shrimp industries, depletion of shad fisheries has been going on for many years and this industry will not be materially affected by better times. The total yield of food fish has been maintained, to some extent, only by the increased utilization of the cheaper and less desirable varieties, and an increased intensity of fishing, along with improved methods of production in the plants.

Shad: The problem of rehabilitating and conserving the shell fisheries of North Carolina is of primary importance and is being given thorough consideration. Plans to this end have been made by the Board of Conservation and Development, and will be put into effect. A summary of the proposals concerning this fishery is as follows: a deadline for fishing near the ocean to permit the entrance and departure of shad to and from

the ocean; definite open and closed limits; closed periods each week during the season; location and protection of shad spawning areas; stricter fishing regulations; resumption of shad hatching operations and the rearing of a limited number of the hatch to fingerling size in cooperation with the U. S. Bureau of Fisheries; and a detailed study of the shad situation in North Carolina.

The efficacy of such a program, once put into operation, is clearly shown in the Alaska Salmon industry. Like the shad in many of its characteristics, salmon were facing complete depletion. It was only after the most strict regulations were put into force that depletion stopped and rehabilitation began. In any event, temporary loss on the part of the shad fishery is certainly to be preferred rather than permanent suspension of the industry because of the total depletion of the resource.

The peak production in shad came in 1897 when nearly nine million pounds were taken. The second high year in production was 1902, over six and one-half million pounds representing the total catch. The takes remained fairly even through the years up to 1931, when production dropped to the lowest in the history of the industry. Only 621,000 pounds of shad were taken in this year. In 1934, the total catch had increased to 1,274,000 pounds.

All Other Food Fish: The following table shows the relative values of the total catches of all fish, including shad, taken in North Carolina waters:

TABLE XLV

North Carolina Production of food fish, by species.
(Compiled from U. S. Bureau of Fisheries Report, 1934.)

Species	Pounds	Value
Alewives	14,897,000	\$90,901
Bluefish	1,766,500	63,515
Butterfish	43,500	745
Catfish and Bullheads	162,600	3,173
Croaker	7,682,800	91,058
Eels	44,300	2,043
Gizzard Shad	24,000	230
Hickory Shad	99,700	4,634
Mullet	3,889,300	105,289
Pickrel	1,200	66
Pompano	400	60
Shad	1,274,000	193,187
Spadefish	6,000	150
Spot	4,788,000	73,035
Spotted Trout	1,849,100	96,165
Sturgeon	1,600	160
White Perch	522,200	22,243
Black Bass	1,500	75
Bowfin	600	6
Carp	108,600	4,316
Cero	4,400	220
Red Drum	132,500	2,750
Flounders	987,500	42,150
Starfish	820,000	12,325
Kingfish	302,000	7,240
Pigfish	92,000	1,130
Pinfish	180,000	900
Sea Bass	75,400	3,045
Sheephead	3,700	80
Spanish Mackerel	47,700	2,358
Gray Trout	7,729,400	180,588
Striped Bass	362,000	35,675
Sunfish	100	1
Yellow Perch	17,200	480
Totals	154,567,900	\$1,395,596

Menhaden. The menhaden industry is greatly influenced by the demand for acid scrap, dry scrap, oil, and meal. Production reached its peak in an abnormal catch of 180 million pounds in 1918. Although natural fluctuations have characterized the menhaden catch since the beginning of the fishery, within the last decade a decline has been apparent in the available supply of the resources. The effect of this decline has been aggravated, to some extent, by the fact that present handling plants were built during the years when catches were excessively large. With the reduction of menhaden catches and a lack of raw material, the factories have been forced to curtail operations drastically.

TABLE XLVI

Catches of Menhaden and Products Manufactured by the Industry.
(Compiled from U. S. Bureau of Fisheries Report.)

Year	Catch	Products					
		Dry Scrap and Meal		Acidulated scrap		Oil	
	Pounds	Tons	Value	Tons	Value	Gallons	Value
1927.....	98,987,000	7,353	\$ 357,659	7,468	\$ 161,790	782,778	\$ 330,685
1928.....	99,302,355	8,346	480,780	7,333	186,476	633,806	248,897
1929.....	173,489,840	7,103	347,894	5,887	158,184	753,722	323,904
1934.....	106,651,100	3,207	107,552	4,768	85,800	407,300	72,960

In 1927, fifteen factories were converting menhaden into scrap, meal, and oil. The number operating dropped to 12 in 1928 and 1929; and in 1936, only seven factories were in operation.

A study of Table XLVI, and the factors influencing production, reveals that even with the decrease noted, very little opportunity has been offered for an increase in price. This condition results from the fact that the value of meal and scrap has been influenced adversely by competitive materials of more uniform supply. Production costs have increased rapidly, in fact so rapidly that the problem of the cost of production exceeding the sale value of scrap, meal, and oil faces the industry.

Three general recommendations are made for the industry by the U. S. Bureau of Fisheries: production from a given quantity of raw material may be increased by reducing the losses of materials in the present process; higher quality products are in greater demand and, consequently, have more value; and production costs may be reduced by the application of new methods on vessels and at the factory.

In North Carolina, the industry, according to the Bureau of Fisheries Report, is concentrated at two points—in the vicinity of Southport, and around Beaufort. Fish are present in the water adjacent to the coast from April until January. However, the bulk of the catch is not made until the fall. The spring run, which is quite small, generally lasts from April until January. The fall run is attributed largely to a southern migration of fish and comes between September and January. Vessels operating out of the Southport district fish from Cape Fear northward along the coast. Vessels hailing from the Beaufort district fish to the south toward Cape Fear and northward as far as Cape Hatteras. Fish are also taken in Core Sound.

SHELLFISH

Taken in the order of their more recent returns, shellfish are now considered.

Crabs: The soft crab industry centers in two counties—Carteret and Currituck. Production in Carteret County in 1936 amounted to some 70,000 dozens, valued at nearly \$53,000. Currituck County produced nearly 700 dozens, amounting to nearly \$500 in value.

Hard, or blue, crabs are found all along the coast. The extremely cold weather which played havoc with crabs in Chesapeake Bay during 1934 placed a heavy demand on the industry in this State for several years, a demand that was hard to meet because of the adverse weather conditions which held over the North Carolina coast in the winter of 1935-36.

Shrimp: As in the case of the soft crab industry, shrimping is confined to two counties—Brunswick and Carteret. The prosecution of this fishery and the packing and allied industries, however, is of great importance to entire communities in this State, contributing as these industries do an important food product for domestic and foreign trade.

Improved handling and marketing methods have greatly accelerated the shrimp fishery during recent years. Heavy demands are being made upon all shrimp producing waters, and it has become essential that proper steps be taken to assure the future supply of this crustacean. Conservation practices should not only deal with the technological development of fishing, but should also include plant operation, and improved business methods. The establishment of new markets for shrimp is also to be desired.

Production figures in 1934 and 1936 are fairly even, showing a stable condition. In 1934, the catch amounted to some 2,600,000 pounds, valued at nearly \$81,000. For 1936, the catch was approximately 2,400,000 pounds, valued in excess of \$78,000.

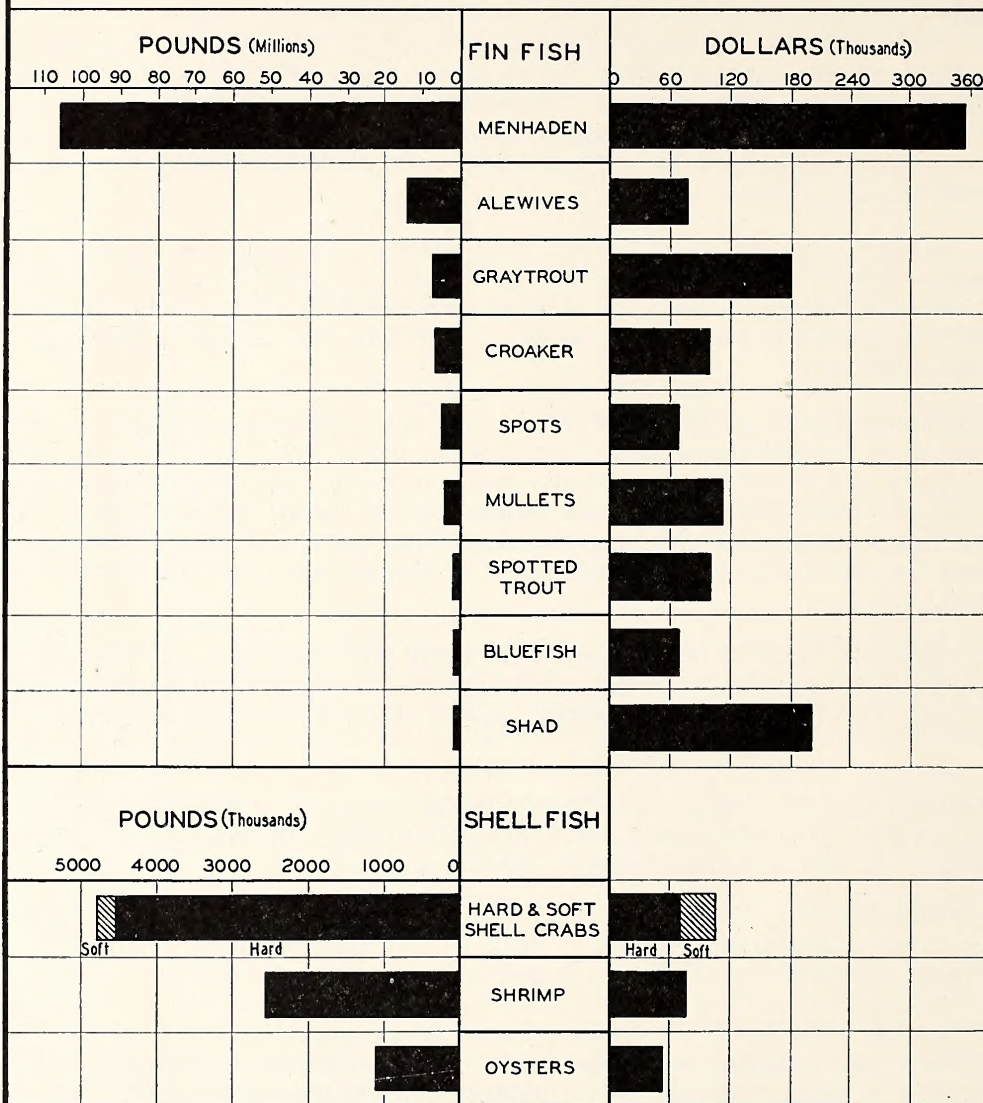
Clams: Production of clams in commercial quantities is limited to the waters of Brunswick, Carteret, Pender, and Onslow Counties, with a few being taken in Hyde and Dare counties. Only one species, the hard clam, is taken. The catch for 1934 amounted to 338,000 pounds, and was valued at \$33,647.

Practically the entire production at present is carried out of the State by motor truck. A most satisfactory increase in value to this State might be obtained through handling and marketing hard clams in North Carolina.

Escallops: Confined to the waters of Carteret County, the scallop fishery was at one time a most valuable phase of the fishing industry. However, in 1932, 1933 and 1934, production dropped far below that of former years. The grass on which ducks and geese feed and to which the scallop spat attaches itself was killed out along the Atlantic Coast. As a result, escallops in commercial quantities have been very scarce. Considerable damage has been done the fishery by fresh water entering the producing areas during the times of flood and high winds.

PRODUCTION AND VALUE OF PRINCIPAL FIN FISH AND SHELLFISH SPECIES

1934



SOURCE:

U.S. BUREAU OF FISHERIES REPORT, 1934

FIGURE 9

"There appears to be no reason why scallops should not thrive almost anywhere in the waters of the coastal section, having the same salinity as that on the present producing grounds, and where there is suitable quantities of grass. The matter is important enough to risk the outlay necessary to transplant a few thousand bushels for experimental purposes." (Fifth Biennial Report).

Present scallop grounds extend from the neighborhood of Davis Island, in Core Sound, to the western part of Bogue Sound. The larger scallops are found in Beaufort Harbor, Newport River, and lower Bogue Sound.

TABLE XLVII.

Production of Bay Scallops in North Carolina.
(Compiled from U. S. Bureau of Fisheries Report.)

Year	Pounds	Value	Year	Pounds	Value
1928	1,394,124	\$125,845	1931	495,000	\$50,250
1929	686,220	37,960	1932	91,458	6,560
1930	431,826	53,923	1934	36,000	6,000

Diamond Back Terrapin: The demand for Diamond Back Terrapin has increased rapidly within the past three years. The work of rehabilitating terrapin in North Carolina was begun several years prior to the repeal of the Eighteenth Amendment. As a result, the fishery was in good condition to supply the greatly increased demand, which followed that act.

The work of the U. S. Fisheries Biological Station at Beaufort has been valuable in restocking the Diamond Back Terrapin, planting from five to ten thousand each year. Under regulations designed to protect the industry against the depletion previously experienced, the terrapin industry presents an opportunity for development.

Production and Value: The relative production and value of the principal species of fin fish and shellfish are shown in figure 9.

From the accompanying graph, it is found that of the total production of principal species, menhaden represents 70 per cent of the total catch; alewives, 10 per cent; gray trout, 4 per cent; mullet, 3 per cent; and shad, less than 1 per cent.

Menhaden also led in value, reaching to 28 per cent of the total value of the principal species. Shad, though representing less than one per cent of the total catch, amounted to 15 per cent of the total value. Gray trout was third with 14 per cent. Alewives represented 8 per cent of the total value; while mullet and croakers were 8 per cent each; spot and spotted trout, 7 per cent each; and bluefish, 5 per cent.

Among the shellfish, hard crabs were 52 per cent of the total catch of principal species, and represented 28 per cent of the total value; soft crabs, 3 per cent of the catch and 15 per cent of the total value; shrimp, 31 per cent of the catch and 34 per cent of the total value; and oysters, 13 per cent of the catch and 23 per cent of the total value.

North Carolina's Rank in Commercial Fisheries Industry: North Carolina remains far in advance of all other South Atlantic States in the commercial fisheries industry. Florida, as a complete fisheries unit, leads North Carolina, but only the east coast fisheries are considered a part of the South Atlantic group; the west coast fisheries of Florida being a part of the gulf state fisheries. No separate analysis of east and west coast fisheries being available, total production and value are given for Florida.

TABLE XLVIII
COMMERCIAL FISHING INDUSTRY
COMPARISON WITH OTHER STATES

Item	North Carolina	South Carolina	Georgia	Florida
Fishermen	5,355	1,493	988	7,508
Vessels:				
Motor	93	5	46	202
Sail	298	...	...	...
Total net tonnage	1,638	67	421	3,316
Boats:				
Motor	1,334	94	122	2,064
Other	1,829	762	423	2,966
Accessory boats	112	...	6	18
Production—Fin Fish:				
Menhaden, lbs.	106,651,100	...	18,751,500	38,983,400
Value	\$ 355,503	...	\$ 63,859	\$ 121,643
Alewives, lbs.	14,897,000	...	...	214,900
Value	\$ 90,901	...	...	\$ 1,055
Gray Trout, lbs.	7,729,400	2,000	...	10,000
Value	\$ 180,588	\$ 130	...	\$ 500
Croaker, lbs.	7,682,800	...	7,000	52,400
Value	\$ 91,058	...	\$ 280	\$ 1,194
Mullet, lbs.	3,889,300	700,000	59,000	23,966,300
Value	\$ 105,289	\$ 19,000	\$ 2,600	\$ 641,127
Bluefish, lbs.	1,766,500	3,000	...	1,933,900
Value	\$ 63,515	\$ 180	...	\$ 100,675
Shad, lbs.	1,274,000	208,600	232,000	782,200
Value	\$ 193,187	\$ 31,290	\$ 38,400	\$ 66,986
Production—Shellfish:				
Crabs, lbs.	4,795,000	8,000	483,500	1,114,700
Value	\$ 103,448	\$ 160	\$ 7,252	\$ 26,977
Shrimp, lbs.	2,563,900	1,801,400	6,842,900	16,292,200
Value	\$ 80,367	\$ 54,042	\$ 203,127	\$ 497,870
Oysters, lbs.	1,160,700	2,861,900	568,700	2,036,000
Value	\$ 53,092	\$ 101,774	\$ 31,361	\$ 101,631
Total Production:				
All Fin Fish, lbs.	154,567,900	1,168,400	19,233,900	97,899,100
Value	\$ 1,395,596	\$ 63,063	\$ 116,490	\$ 2,117,934
All Shellfish, lbs.	8,894,000	4,722,800	7,907,000	20,901,600
Value	\$ 276,629	\$ 162,228	\$ 243,020	\$ 1,516,788
Grand Totals:				
Production, lbs.	163,461,900	5,891,200	27,140,900	118,800,700
Value	\$ 1,672,225	\$ 225,291	\$ 259,510	\$ 3,634,722

TABLE XLIX

INDUSTRIES RELATED TO COMMERCIAL FISHERIES INDUSTRY

Item	North Carolina	South Carolina	Georgia	Florida
Transporting:				
Persons Engaged:				
On Vessels	87	104	23	56
On Boats	11	58	10	36
Totals	98	162	33	142
Wholesale and Manufacturing:				
Establishments	84	31	29	241
Persons engaged:				
Proprietors	1 104	40	37	253
Salaried employees	21	18	15	157
Wage earners:				
Average for Season	1,269	564	945	1,796
Average for Year	465	223	235	916
Salaries and Wages Paid	\$ 275,175	\$ 146,763	\$ 158,356	\$ 787,572
Manufactured Products	\$ 609,942	\$ 526,301	\$ 640,996	\$ 1,438,418
Fisherman's Mfg. Products:				
Persons engaged	267	8	14	402
Products	\$ 56,633	\$ 957	\$ 7,335	\$ 32,988

OYSTERS

Although there are more than a million acres of potential oyster bottoms in the State, production is limited to some 12,000 acres. The acreage of bottom in Pamlico Sound and contiguous waters actually producing oysters for market represents a mere fraction of the total oystering grounds which could be made productive by the application of modern methods of oyster culture. Development of these thousands of acres is of major importance to the State.

The most recent exhaustive study of oyster bottoms in North Carolina was made by Galtsoff and Seiwel of the U. S. Bureau of Fisheries in 1928. Biological studies are conducted almost continuously by the Bureau of Fisheries Biological Station at Beaufort.

The following extracts are from the Galtsoff and Seiwel report Economic Circular No. 66:

"Oysters are found widely scattered throughout Pamlico Sound, but not all the Sound can be considered as good oyster territory. The most favorable location . . . appears to be along the western side from Roanoke Marshes on the north to Orchard Creek and Garbacon Shoal on the south. The bays and estuaries in this region present especially favorable locations.

"Harbor Island Beds: On the shoal south of Harbor and Wainright Islands, the bottoms are hard sand. Oysters are generally well-shaped, but south of Harbor Island are beds containing great numbers of small oysters. The beds in this vicinity are liable to sanding in case the shoals shift in time of storm.

"Portsmouth Beds—on the shoals between Royal Shoals and Ocracoke Inlet. These beds contain numerous well-shaped oysters. The Portsmouth beds are subject to sanding from shifting shoals.

"Point of Marsh and Raccoon Key Beds—on a half-mile wide shoal, extending from Point of Marsh to Raccoon Key and the Swan Islands. Oysters are well-shaped and of excellent quality.

"Neuse River Beds—include the oyster beds in the Neuse River lying below Garbacon Shoal. In general, the beds along the Neuse River produce oysters of good quality.

"Bay River Beds—opposite Petty Point and in the second channel opposite Red Can Buoy north of the mouth of Banner Bay. The hard shoals of Banner Bay offer good farming bottom.

"Old Sow-Brant Island Beds—on the shoals between north entrance of James Bay and Old Sow and Brant Island up to Mouse Harbor. Oysters are well-shaped and of good quality. The beds appear well protected from sanding.

"Oyster beds lying between the mouth of Pamlico River and Bluff Point—include the following beds: Judith Island bed on shoals west of Judith Island; Shell Point bed south of Shell Point; Swanquarter Bay beds, eastern side of Swanquarter Bay; Great Island beds, west of Great Island; and West Bluff Bay beds, scattered over West Bluff Bay shoals. Oysters are large and well-shaped on the Judith Island and Shell Point beds. In the other beds, oysters tend more toward growth in clusters and are not as large or well shaped.

"Wyesocking Bay beds—near Hog Island and Mount Pleasant Bay in center of Wyesocking Bay. Generally overcrowded conditions prevail, resulting in small, irregular shaped oysters.

"Far Creek and Pains Bay beds—about five miles south of the mouth of Long Shoal River. Oysters are not numerous, but are usually large.

"Stumpy Point Bay beds—about ten miles south of Roanoke Island. Large quantities of good quality oysters are found.

"Croatan Sound—lying between Albemarle and Pamlico Sounds. Presence of fresh water makes this area unsuitable for oyster growing.

"Roanoke Sound—conditions not favorable for oyster growing.

"Core Sound—extends from southeastern extremity of Pamlico Sound to Beaufort Harbor. The northern side of the sound is indented with numerous bays and estuaries. The principal beds are found in these areas, and include West Drum Shoal bed, artificial, being planted first in 1925; Styrian Bed, with well-shaped oysters of good quality; Eastmouth Bay Bed, lying on a soft, muddy bottom, oysters being of an inferior quality.

"In summary, it may be said that Core Sound is well suited for the growing of marketable oysters. Oysters grown in West Bluff Bay, Wyesocking Bay, Far Creek, and adjacent parts of Pamlico Sound are very poor. Better oysters were found in Swanquarter Narrows, Judith Point, and around Brant Island. High quality oysters were found in Bay River, Pastor Shoal, Mason's Bay, at Point of Marsh, Raccoon Key, Swan Island, and in Neuse River.

"Certain localities in Core Sound, such as Oyster Creek, Atlantic, Willis Creek and others, are especially suitable for oyster farming."

The following table shows the catch of oysters in pounds and the value of production, 1927-1936:

TABLE L

(Catch in thousands of pounds:)

Year	Pounds	Value
1927	3,041	\$200,742
1928	2,900	167,490
1929	3,587	245,533
1930	2,205	155,148
1931	1,500	90,061
1932	1,203	51,339
1934	208	53,092
1936*	200	55,000

*Estimated for 1936

The significance of North Carolina's oyster resources is much greater than the comparatively small catches indicates. The waters of Pamlico Sound are a source of great quantities of seed oysters for the bottoms of Chesapeake Bay. No data is available on the amount of seed oysters exported, but judging by the operations of Maryland and Virginia boats in the Pamlico area, the figures must be significant.

In regard to the possibilities for successful oyster farming in the coastal region, circumstances and general conditions here are very favorable. There is a vast acreage of barren bottom suitable for growing high grade, marketable oysters. A large supply of excellent seed stock for planting can be obtained at lower cost than in other regions; and there is virtually no pollution. These areas have never suffered severely from natural enemies of the oyster, which in other states cause serious damage. There is an almost unlimited market for cultivated oysters in the State and throughout the South Atlantic region.

Within the past three years, effective work in planting seed oysters and shells has been carried on by the CWA, the ERA, and WPA, under the sponsorship of the Department of Conservation and Development. This program is still being carried on by the Works Progress Administration. Since the beginning of oyster planting by these relief agencies, some 2,000,000 bushels of oysters and shells have been planted.

INDUSTRIES RELATED TO THE COMMERCIAL FISHERIES OF NORTH CAROLINA

Prior to 1930, variations in the number of wholesale and manufacturing establishments followed closely the abundance or lack of raw material necessary for operation. The same factor has been present, but to a smaller degree, in influencing operations in in subsequent years.

The following table presents comparative figures for Industries related to the Fisheries of North Carolina, 1927-1934:

TABLE LI

Item	1927	1928	1929	1930	1931	1934
Wholesale and Mfg. Establishments. . . .	71	106	90	71	64	84
Persons employed.	555	700	740	331	290	468
Total salaries-wages.	\$ 354,720	\$ 280,379	\$ 371,966	\$ 233,924	\$ 179,967	\$ 275,175
Value mfg. products.	\$ 1,036,841	\$ 1,230,475	\$ 1,230,535	\$ 966,970	\$ 447,095	\$ 666,575

The depression was the dominant force retarding wholesale and manufacturing in 1930, 1931, and 1933. This fact is borne out when it is learned that the catch in 1932 showed a slight increase over 1931, while the value of production dropped to the lowest level in the industry since 1902.

Persons employed represent all salaried employees and wage earners, the latter group being computed from average for the year employment. In this connection, it is interesting to note that, although 232 more persons were employed in 1928 than in 1934, the total salaries and wages paid in the latter year was only some \$5,000 less than in 1928. The value of production in 1934, however, was only 54 per cent of that of 1928.

Actually production of manufactured products in 1930 and subsequent years is not comparable with former years, since fresh and frozen packaged fishery products are now included in the total value. However, a graphic picture of the decline in the value of manufactured products, considering the fact that fresh and frozen packaged products are now added, is given.

The U.S. Bureau of Fisheries has made available the following County data on Industries related to the Fisheries of North Carolina, the report being for the year 1934.

TABLE LII

INDUSTRIES RELATED TO THE FISHERIES OF NORTH CAROLINA — 1934

By Counties

	Beaufort County	Bertie Pasquo- tank and Wash- ington Counties	Brunswick County	Carteret County	Dare County	New Hanover County	Onslow and Pender Counties	Pamlico and Craven Counties	TOTAL
Establishments	12	5	5	33	3	4	6	16	84
Persons engaged:									
Proprietors	15	6	7	36	4	5	8	23	104
Salaried employees . .	1	7	7	5	..	..	..	1	21
Wage earners:									
Average for Season	373	163	207	296	38	15	20	157	1,269
Average for Year . .	160	36	106	82	12	8	5	56	465
Paid to salaried Em- ployees	\$ 600	\$ 12,800	\$ 33,247	\$ 7,500				\$ 1,250	\$ 55,397
Paid to wage earners . .	\$ 54,981	\$ 20,738	\$ 46,753	\$ 44,402	\$ 5,940	\$ 6,019	\$ 3,285	\$ 37,660	\$ 219,778
Total Salaries and wages	\$ 55,581	\$ 33,538	\$ 80,000	\$ 51,902	\$ 5,940	\$ 6,019	\$ 3,285	\$ 38,910	\$ 275,175
Value of Manufactured products	\$ 172,185	\$ 50,379	\$ 119,816	\$ 242,242	*	*	\$ 3,400	\$ 40,350	\$ 666,575

Includes products manufactured by both wholesale dealers and fishermen.

*The value of products manufactured in Dare and New Hanover Counties has been included with that for Brunswick County.

†Includes \$38,203 total for Chowan, Tyrrell and Martin Counties.

A further analysis of the production of wholesale and manufacturing plants in North Carolina, showing the quantity and value by counties and products, is given in Table LIII.

Some Problems and Future of the Industry: Fluctuations, perhaps more decided than for any other industry of similar importance, have characterized the commercial-fisheries of North Carolina in the past. However, in view of recent trends, there are indications of greater stabilization in the industry.

Not only are the fisheries subject to variations in economic conditions, but they are affected materially by the weather and biological factors. During periods of severe weather, fishing activities are naturally at a standstill, and then again, the availability of fish varies. Still another factor demanding special consideration is the high perishability of seafoods.

The principal immediate problems confronting the fisheries have to do with marketing. During the period of generally depressed business conditions, the demand for seafoods from North Carolina dropped to the lowest ebb in many years. Because of the slackened demand and lower prices, fishing operations were curtailed, and even the reduced supply of fish was not absorbed by the markets. This resulted in the waste of a considerable volume of fish.

TABLE LIII
FISHERIES OF NORTH CAROLINA, 1934
Production of Manufactured Products

		Quantity	Value
BY MANUFACTURING ESTABLISHMENTS:			
Alewife roe, canned:			
Bertie.....	Standard Cases...	5,665	\$ 16,609
Alewives, corned, Spot, salted and packaged fish:			
Bertie, Carteret, Washington.....	Pounds.....	2,446,000	25,800
Menhaden Products:			
Brunswick and Carteret:			
Acid scrap and meal.....	Tons.....	5,771	122,345
Dry scrap.....	Tons.....	3,207	107,552
Oil.....	Gallons.....	407,000	72,960
Mullet, salted:			
Carteret and New Hanover.....	Pounds.....	507,000	22,419
Crab Meat, fresh picked:			
Beaufort, Carteret, and Dare.....	Pounds.....	437,042	143,437
Oysters, fresh shucked:			
Beaufort.....	Gallons.....	41,320	36,370
Carteret.....	Gallons.....	20,425	16,155
Pamlico.....	Gallons.....	29,800	25,140
Craven, Onslow and Pasquotank.....	Gallons.....	18,100	16,280
Oyster shell lime and poultry shell:			
Beaufort, Pamlico, Washington.....	Tons.....	1,050	4,875
Total.....			\$ 609,942
BY FISHERMEN:			
Alewives, corned:			
Beaufort.....	Pounds.....	30,000	\$ 240
Bertie.....	Pounds.....	300,000	3,000
Chowan.....	Pounds.....	1,962,000	21,350
Martin.....	Pounds.....	450,000	4,500
Tyrrell.....	Pounds.....	500,000	5,000
Washington.....	Pounds.....	300,000	3,000
Alewives, tight pack roe:			
Chowan.....	Pounds.....	103,700	5,185
Alewives, tight pack cut:			
Chowan.....	Pounds.....	54,200	2,168
Mullet, salted:			
Hyde.....	Pounds.....	10,000	400
Oysters, fresh shucked:			
Carteret.....	Gallons.....	2,850	1,790
Onslow.....	Gallons.....	2,000	2,000
Scallops, bay, shucked:			
Carteret.....	Gallons.....	4,000	8,000
Total.....			\$ 56,633
GRAND TOTAL.....			\$ 666,575

These conditions emphasized some of the most acute problems of the industry, more especially those connected with marketing and the handling of fish. The particular need of more adequate storage facilities, more widespread distribution, and new and improved forms of processing was brought out.

Officials for a number of years have been devoting much thought to measures to improve and develop the industry. Various proposals, among which are the organization of cooperatives, the establishment of definite standards and grades of seafoods, the provision of more adequate storage facilities, new processing methods, and a campaign

to increase the consumption of seafoods, have been considered by the Department of Conservation and Development.

In 1935, a co-operative was formed through the Emergency Relief Administration, which advanced the funds for establishing a main plant, three branches, and initial operating expenses. The main plant at Morehead City provides storage space for 800,000 pounds of seafood. This plant also has facilities for processing and marketing seafoods in new forms.

This additional storage space should help to fill a great need of the commercial fisheries. With the larger storage facilities and constantly improving methods of handling, the improved quality of product should bring better prices to the fishermen and build a more prosperous and stable industry.

Many of the plans suggested for the benefit of the industry are considered worthy and practicable, and the Department of Conservation and Development hopes to put those most needed into effect as soon as means with which to carry out such activities are provided.

Extensive efforts should be made to increase the popularity and demand for seafoods in this part of the country. A step toward this goal is the improvement in quality and variety of products being made available to the public. North Carolina and adjoining States have not consumed seafoods at a per capita rate equal to that of the country as a whole. When this point is reached, North Carolina alone would be able to absorb the average annual production of her fisheries. From the standpoint of palatability and healthful qualities of fish and other marine products, as well as the assistance it will give an important industry of the State, efforts to increase the demand for this type of food will be justified.

Aside from markets and associated considerations, the principal problems of the industry concern the maintenance of the source of supply. Due consideration is given these problems by the Board of Conservation and Development, to which has been delegated broad regulatory authority over the fisheries by the General Assembly. The Board is striving by means of protective measures to preserve the supply of seafoods. It reconciles, insofar as is possible, the immediate needs of the fishermen and the demand for some restrictions to prevent unnecessary waste and to preserve a permanent source of income. At times it is necessary to make decisions that are unpopular in immediate effects, but which are vitally needed if the natural resources upon which the fishermen draw are to be maintained as a source of future income and public food supply.

A steadily declining supply of shad has caused the Board to formulate a long-time program for the replenishment of this valuable branch of the fisheries. The diamond-back terrapin has been brought back almost from extinction to a status where it may once again assume an important place as an income-producer for the fishermen.

One of the most useful commercial fishery projects launched within the last few years is the planting of oysters. This activity, sponsored by the Department of Conservation and Development, and carried out by various relief agencies, including the CWA, ERA, and WPA, has resulted in the spreading of more than 2,000,000 bushels of seed oysters and shells over suitable sound bottoms in the State during the last three years.

The oyster planting program has several objectives, among which are the re-establishment of beds badly damaged or wiped out by suffocation from storm-driven sands in 1933 and 1934, the creation of new producing areas, and the demonstration of oyster culture.

Oyster cultivation is generally acknowledged to be one of the most promising industrial opportunities in the State. As has been previously pointed out in this chapter, only about one per cent of the acres of sound bottoms in North Carolina believed capable of growing oysters is at present productive. Liberal lease terms for suitable shellfish bottoms are provided to encourage individual initiative in the development of the industry.

Cultivated oysters have always had a ready demand in the State because of their attractive size and good flavor. They virtually always bring a premium over the bivalves produced on public grounds, and a number of the growers have contracts for their entire crop. By careful selection and other measures, privately controlled oyster grounds will produce continuous crops. Any persons interested in oyster culture should communicate with Capt. John A. Nelson, State Fisheries Commissioner, Morehead City.

Up to the present there have been only limited attempts at private culture of other shellfish in North Carolina and it is believed that scallops and clams offer opportunities similar to those presented by the oyster. The U. S. Bureau of Fisheries maintains a biological laboratory at Beaufort for scientific studies of shellfish and its officials are glad to advise individuals interested in this subject.

Another possibility in the commercial fisheries suggested by the U. S. Bureau of Fisheries is salt water pondfish culture. Dr. Prytherch, of the Beaufort biological station, hopes to test the practicability of such a project by demonstration, when funds can be obtained for this purpose. He proposes to start by penning up several thousand young mullets in an inexpensive pond, and rearing and fattening them up for the market. If the venture with this first species of fish should prove practicable, he believes similar methods with other fish would be successful. Here is an enterprise that appears to have merit and to be worthy of private tests if public funds are not made available for the demonstration.

Reports of the Fisheries Commissioner show that some 25 species of fin fish are taken in commercial quantities from North Carolina waters. In addition, other commercially valuable North Carolina seafoods include shrimp, oysters, clams, scallops, and crabs. Formerly a considerable quantity of North Carolina seafoods has been shipped to other centers and marketed from those points, but there appears to be a trend toward more direct marketing of products from plants in this State.

Until comparatively recently, most of the seafoods taken from the waters of this State have been marketed in the round or as the products came from the water. Panned fish and fillets are now being offered to the trade, and local markets for these products are being established. It is believed that seafoods in these forms will become increasingly popular and that a larger percentage of the products will be shipped.

Canning, drying, salting and other processing methods appear to offer inducements for further development of the seafoods products business. Preparation of fish, shellfish, crustaceans, and other resources of the sea in new and more attractive forms should do much to stabilize the industry, absorb seasonal surpluses, and create new public demands. The commercial fisheries, according to many indications, is one of the most promising fields presented by the State.

CHAPTER XII

RECREATION

The forms of recreation enjoyed within a State are determined, to a great extent, by topography and climate. North Carolina is indeed fortunate in having within her boundaries a number of regions where both climate and terrain are varied enough to allow many forms of outdoor recreation throughout the entire year.

For most outdoor sports, scenery is a necessary adjunct. In this respect, North Carolina ranks among the foremost states of the nation. In fact, the richness and great variety of trees, plants, and animals possessed by North Carolina might well be called the major attraction for increasing thousands of people who enjoy outdoor recreation in North Carolina.

Within the past few years, further impetus has been given the development of recreational facilities, especially State and municipal enterprises, by the various Federal relief agencies which have been and are now operating within the State. The list of projects undertaken by the CWA, ERA, and WPA, in the field of recreation is an imposing one, ranging as it does from the construction of small playfields in industrial and rural areas, to building mammoth stadia. These are works which will be of increasing value to the area in which they are located.

The activities of the Emergency Conservation Work, in co-operation with other interested Federal and State agencies, have been outstanding in the development of public recreational facilities. Under the direction of the National Park Service and the State Park Service, Division of Forestry, the ECW has contributed the major portion of work toward the development of North Carolina's six State Parks, as well as the improvement work in the Great Smoky Mountains Park.

Considered strictly from the standpoint of economic value, recreational facilities established primarily for the tourist trade rank first in importance. In several sections of the State, entire communities are dependent upon the tourist trade, which, in these sections, has become the major industry. Reports from these resort centers in North Carolina at the close of the 1936 summer season tell of the best year since 1929, and one of the most successful years ever experienced by the resort operators.

RESORTS

The diversity of climate, topography, and scenery in North Carolina is emphasized by the types of recreation enjoyed in the different resort sections of the State.

MOUNTAIN RESORTS

Of late years, practically the entire mountain region of North Carolina has come to be considered one great resort area. The construction of good roads has made accessible many new and interesting areas, and has permitted rapid development of these regions for the great influx of health and recreation seekers pouring into the North Carolina mountains.

The invigorating air is conducive to active participation in many forms of outdoor sports, including mountain climbing, horseback riding, hiking, camping in the open, fishing the trout streams and hunting in season, golfing on some of America's most

picturesque courses, swimming and boating in the waters of crystal clear lakes, and motoring over the splendid highways to view the truly magnificent scenery.

The mountains of North Carolina represent the greatest upheaval of the Appalachian Range, furnishing scenery of surpassing beauty, and a variety of shrubs, trees, and wildflowers unequalled in a similar area anywhere in the world. The magnificence of the vast forests and the charm of extensive natural gardens have long been interesting fields of study for some of the country's most eminent naturalists.

Mineral springs and a widely known healthful climate greatly enhance this resort region, thousands of people being attracted to this section solely for these health benefits.

Recreational facilities and accommodations for tourists are excellent and widespread over the region. Even the smaller mountain villages contain hotels, inns, and boarding houses.

The tourist season for the mountain resorts opens in the spring and extends well into the fall. The section lying within the thermal belt, the Tryon area, has a mild climate the year round, making this country unique in that here is found an all-year resort lying within the mountain range.

COASTAL RESORTS

Approximately 300 miles in length, North Carolina's coast furnishes almost unlimited opportunities for recreation and sport. Westward from the seaboard are some of the most inviting inland bodies of water in eastern America, notably White Lake, Lake Waccamaw, Mattamuskeet Lake, and Phelps Lake. Throughout the entire eastern coastal area, swimming, boating, and fishing in lakes, rivers, sounds, and the Atlantic Ocean, are sports which attract hundreds of thousands of visitors from early spring to fall. Excellent ocean beaches are scattered from the northern "banks" at Nags Head to the mouth of the Cape Fear River below Wilmington.

Lying within the very center of one of the greatest game areas in the country, eastern North Carolina furnishes excellent opportunities for fresh and salt water angling; hunting of big game, such as deer, bear, wild turkey; and the shooting of waterfowl.

Beautiful and varied scenery is not lacking for those who visit this area. The "banks", or the barrier reef, represent a natural asset of unusual attraction. On this narrow sand spit, extending virtually the length of the coast, are Cape Hatteras and the famous old lighthouse, Kill Devil Hill with its imposing monument to the Wright brothers, and on the northern "banks", great sanddunes piling up to a height of 70 feet or more. Off the Wilmington coast is Smith Island, covered with palmetto trees, their northern limit of growth, and other sub-tropical flora.

The historical significance of this entire region, and particularly Roanoke Island, Bath, Edenton, New Bern, Kill Devil Hill, Halifax, Ocracoke, Elizabeth City, Beaufort, Morehead City, Wilmington, and the Cape Fear region, is sufficient to make this area a shrine for many thousands of visitors each year.

SANDHILLS RESORTS

The thermal belt in the long-leaf pine section of North Carolina, with its abundance of sunshine, contains some of the most popular winter resorts in the country. Pinehurst and Southern Pines are two of the major wintering places in the Mid-South.

Considered one of the most healthful regions in the United States, the Sandhills area is visited each year by large numbers of people from the north. The mild winter climate permits all forms of outdoor sports, such as golf, tennis, equestrian activities, hunting, fishing, field trials, horse and dog shows, archery, and other sports.

Golf matches and tournaments with outstanding players in the country competing, draw great numbers of visitors to this section each year.

When the great peach orchards are in bloom and the dogwoods flower to fill the woods with acres of blossoms, the Sandhills region is indeed a land of "beautiful vistas."

PIEDMONT RESORTS

The Piedmont region, though not considered a resort section, has several attractions which draw many tourists to this area. Sedgefield, near Greensboro, is one of the popular resort sections in the Piedmont. The excellent golf courses and other facilities for recreation found here raise Sedgefield to the rank of premier resorts in the mountains and the Coastal Plain section.

Many visitors are attracted to the Piedmont area to view Chapel Hill and the University of North Carolina, with its interesting old buildings and beautiful grounds. Duke University, with its formal landscaped grounds and magnificent buildings, is another point attracting large numbers of visitors. Historical places are numerous throughout the entire area, the battlefields of Kings Mountain, Moores Creek, and Guilford Courthouse having been designated as National Military Parks. Thousands of people visit Winston-Salem each year to witness the Easter service conducted according to ancient Moravian custom. Hillsboro, Durham, Salisbury, Greensboro, Charlotte, Lexington, and Raleigh contain many points of historical interest.

Some of the finest upland game bird shooting in the State, particularly quail shooting, is found in Chatham, Guilford, Forsyth, Davidson, and several other counties in this section, where large numbers of out-of-state sportsmen have hunting clubs and preserves. Annual field trials have become an important event in the Piedmont.

The industrial centers, engaged in the manufacture of furniture, tobacco, and textiles, are visited annually by large delegations from this and other countries.

PUBLIC RECREATION IN NORTH CAROLINA

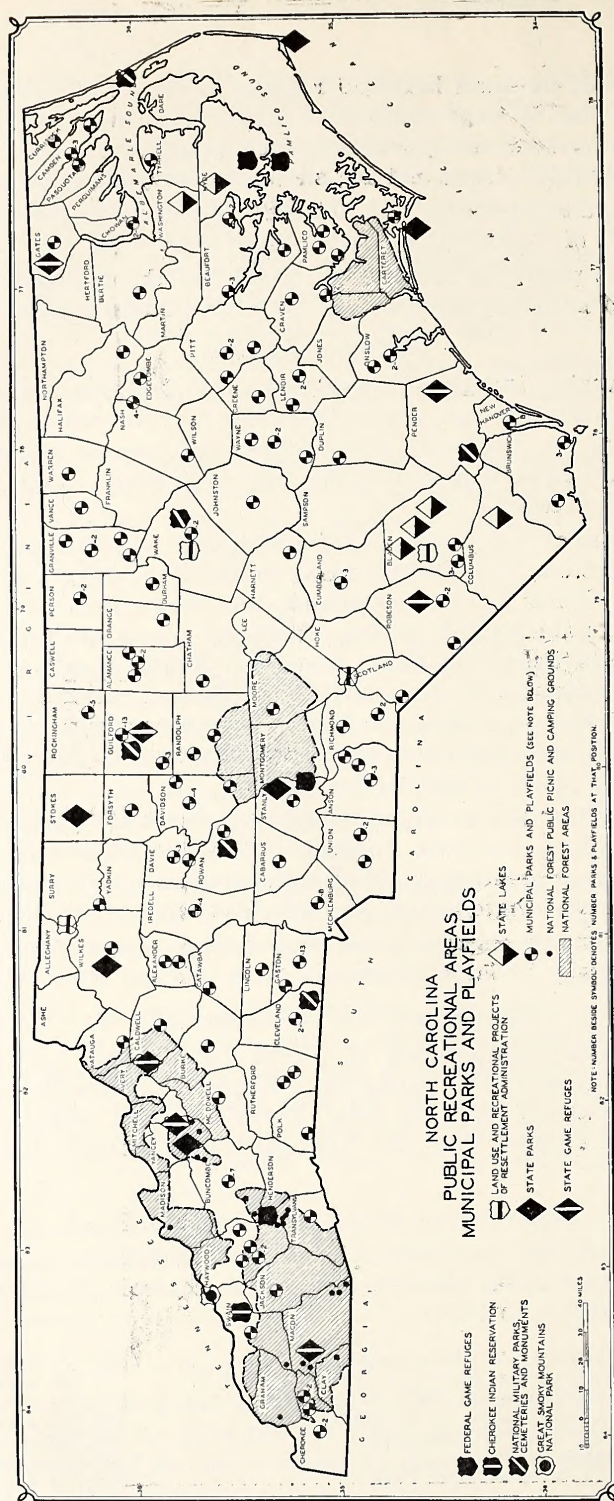
The public recreational program in North Carolina has advanced wonderfully during the past two decades. This period has witnessed the establishment of the Great Smoky Mountains National Park, six State Parks, and the addition of recreational facilities in National Forests, State and National Game Refuges, and in certain sub-marginal land areas.

GREAT SMOKY MOUNTAINS NATIONAL PARK

Congress approved the establishment of the Great Smoky Mountains National Park on May 22, 1926, and set as the minimum area to be acquired, 427,000 acres. The 1936 report of land acquired is as follows:

Land acquired in Swain County	169,126 acres
Land acquired in Haywood County	60,343 acres
Total acquired acres in North Carolina	229,469 acres
Total acquired acres in Tennessee	174,230 acres
Expected acres in Tennessee	210,530 acres
Total acres in Park	403,699 acres
Total expected acres in Park	439,999 acres

PLATE XXII



From the foregoing figures, it is seen that the full acreage for North Carolina has already been acquired. Approximately 36,300 acres must be acquired in Tennessee before full development of the Park can be undertaken. It is not planned to dedicate the Park until the full acreage required for its establishment has been secured, according to the National Park Service.

The estimated number of visitors to the Park in 1936 was over 600,000 persons. In 1935, the Great Smoky Mountains National Park led all other parks in the nation in the number of visitors.

The National Parkway, now under construction, will be a fitting approach to the climax of scenic grandeur in the Great Smoky Mountains National Park. Extending some 250 miles through North Carolina, this Parkway will have an elevation ranging from 2,000 feet to a maximum of 6,000 feet. Passing through some of the most scenic areas of the mountains, this great road will be strictly recreational in purpose, with all commercial traffic prohibited. The first link of this major highway will connect the Great Smokies with the Shenandoah National Park in Virginia.

Although development was not complete in 1936, the Great Smoky Mountains Park contains several camping grounds, some excellent hiking and horseback trails, picnic grounds, and well-stocked fishing waters which are open to the public on designated days. The development of several recreation areas within the Park is now under way.

STATE PARKS

State Parks in North Carolina are viewed as supplemental attractions to the Great Smoky Mountains National Park and a proposed new National Park to extend from Cape Hatteras northward some 50 miles or more.

Development of these parks has gone forward rapidly, the Fort Macon unit on Bogue Banks opposite Morehead City-Beaufort having been dedicated in May of 1936.

Mount Mitchell State Park

This park is located atop the highest mountain peak in eastern America, lying at an altitude of 6,684 feet above sea-level. Some 1,224 acres in size, development features of this area include reforestation, general beautification, and the provision of additional recreational facilities, such as trails, paths, cottages, and other features. Near the top of the mountain is a concession which provides sleeping accommodations, refreshments, and other needs of the visitor.

The average number of visitors to this park, even before completion of development, is 25,000 annually.

At present, the only approaches by motor car are over toll roads. However, plans being considered by the State Highway and Public Works Commission contemplate a road into the park free from any toll charges.

Rendezvous Mountain State Park

Rendezvous Mountain State Park, in Wilkes County, containing some 142 acres, was deeded to the State by Judge T. B. Finley of North Wilkesboro, in 1926. Historical events having an important bearing on the independence of the American colonies centered around this site.

The area is accessible by motor road. The Daughters of the American Revolution have erected a bronze tablet commemorating the deeds of the patriots who assembled here prior to the Battle of Kings Mountain.

Hanging Rock State Park

This park, near Danbury, in Stokes County, lies in the most easterly extension of the mountain region in North Carolina. The area, to comprise some 7,000 acres, was donated to the State by interested citizens.

The scenic attractions of this park are especially interesting, the terrain and flora showing a mixture of Mountain and Piedmont Plateau characteristics. The waterfalls and clear streams are distinctly mountain in character and beauty.

Recreational facilities of a widely varied nature are being provided. Boating and other water sports, cabins, picnic areas, camping sites, foot and bridle paths, and excellent trout fishing will be available for the visitor.

This park, when completed, will accommodate large numbers of people from the north central and middle Piedmont industrial areas.

Morrow Mountain State Park

This area is somewhat similar to Hanging Rock in topography and vegetation. Located in the beautiful Uharie Mountains in Stanly County, this 3,000-acre tract was donated to the State by J. M. Morrow, other individuals, and Stanly County.

Full development of every practicable form of outdoor recreation is under way. Complete water and sanitary systems are being provided.

The radius served by Morrow Mountain State Park will extend into the middle and south central piedmont.

Fort Macon State Park

The major attractions of this 412-acre State Park is Fort Macon, a military fort considered unique in its style of architecture. Established in 1836 and restored several years ago, the Fort Macon State Park was dedicated by Governor J. C. B. Ehringhaus and State and National Park officials, in May, 1936.

Located near one of the chief resort sections of the Coastal region and adjacent to some of the finest salt water sport fishing on the North Carolina coast, Fort Macon State Park is already entertaining thousands of visitors annually.

Cape Hatteras State Park

Known to seamen the world over, this famous Cape, located on the "banks" off the coast of North Carolina, is without doubt one of the most interesting portions of shore along the Atlantic Coast. Lying some 30 miles off the mainland, the very seclusion of Cape Hatteras State Park appeals to the imagination of many tourists.

Developments now under way consist of provisions for boating, picnicking accommodations, erection of cottages, and other improvements.

Cape Hatteras Lighthouse, the loftiest beacon in the United States, lately abandoned, is within the park.

The shore of this park is one of the world's finest places for surfcasting for channel bass. From Hatteras Inlet, boats are chartered for trips to the Gulf stream. Dolphin, amberjack, tarpon, and other game fish are taken off this Cape.

Crabtree Creek State Recreation Area

This area represents a new type of recreational development in North Carolina. Within a few minutes drive of Raleigh, this 6,000-acre tract has been purchased by the Resettlement Administration.

Plans for development of the area call for extensive facilities for all types of recreation. It is expected that the administration of this area will be turned over to the State Department of Conservation and Development upon completion of development.

NATIONAL FORESTS

Full application of the multiple-use of National Forest lands has resulted in the development of extensive recreational facilities within these forests.

Pisgah National Forest

There are ten camp grounds and scenic areas within the Pisgah National Forest. Facilities available at the camp grounds include picnic shelters, water systems, latrines, fire grates and chopping blocks, garbage pits, tables, racks, benches, and registry boards. Several of these areas have swimming pools and diving boards. Picnic grounds have fire grates, water, latrines, benches and tables.

Summer home sites have been established in the Stony Fork sector of the Pisgah National Forest, Buncombe County. There are 15 lots of from one to two acres which rent for an annual fee of from \$25 to \$50. These permittees are granted an annual lease, renewable each year, as long as the Forest Service regulations are not violated.

The outstanding scenic areas of this forest are the Craggy Gardens—rhododendron gardens at an elevation of over a mile and approximately 500 acres in extent, accessible by a scenic Forest Service road; Linville Gorge, a primitive area free from man-made improvements and one of the wildest and most rugged areas in eastern United States; Middle Ridge, an area of virgin spruce maintained as a natural tract free from all improvements.

The outstanding scenic drives are Craggy Gardens Road, Pisgah Motor Road, Yonahlossee Trail, and North Carolina Route 104 through Burke, Yancey, and McDowell counties.

The outstanding points of scenic interest are Craggy Dome, Mount Mitchell, Mount Pisgah, Table Rock Mountain, Devil's Courthouse, Looking-Glass Rock, Shining Rock, Cedar Rock Mountain, Rich Mountain, and Grandfather Mountain.

The recreational use of the Pisgah National Forest in 1935 was as follows:

Type of Use	Number
Hikers	8,000
Campers	7,500
Picnickers	67,000
Tourists	100,000
Hunters	1,500
Fishermen	2,500
Total Number	186,500

Nantahala National Forest

This forest contains eight fully developed camp and picnic grounds, equipped with fire-places, tables, shelters, garbage pits, benches, incinerators, latrines, hydrants, water, registry boxes, etc.

One of the most recent developments in the Nantahala Forest, the establishment of the Joyce Kilmer Memorial Forest, created nation-wide interest. Fifteen miles southwest of Robbinsville in Graham County, this forest contains 3,000 acres of virgin timber. Ample facilities for parking cars and handling visitors have been made available.

Outstanding scenic areas in the Nantahala National Forest include nearly all the mountain tops—Wayah Bald, Satulah Mountain, Yellow Mountain, Cowell Bald, Standing Indian, Tellico Bald, and Big Stomp Knob.

Lakes Sequoyah, Emory, and Santeetlah attract many visitors. The Nantahala Gorge is considered one of the most striking scenic areas in western North Carolina. Numerous beautiful streams with many waterfalls enhance the charm of this forest area. The Appalachian Trail and numerous other trails and Forest Service roads make all points of interest accessible to the visitor.

Four Home-site Units have been set up in the Nantahala Forest, Skittle Creek Summer Unit near Highlands in Macon County (now under development), and Highlands Home-site Units Number One, Two, and Three (proposed).

The Skittle Creek Unit contains 30 acres of land open for lease to anyone desiring to construct a summer home. The homes built must meet the specifications required by the Forest Service and be approved by the Forest Officer in charge. Leases will be granted and annual charges of from \$15 to \$25 per year will be made. These proposed home-site units are not open for lease at the present time.

RECREATIONAL WORK OF THE RESETTLEMENT ADMINISTRATION

The Resettlement Administration has two Land Use Projects and two National Park projects in which recreational facilities are being developed.

In addition to reforestation and re-stocking with wildlife on the Hoffman and Elizabethtown areas, extensive development of other recreational facilities is in progress. Near Hoffman, a camp capable of accommodating 200 4-H Club boys and girls is being set up. A number of cabins, bath houses, and recreational buildings are being constructed around Jones and Salters lakes in the Bladen County area.

In co-operation with the National Park Service, the Resettlement Administration is developing recreational projects upon the 6,000-acre Crabtree Creek area near Raleigh in Wake County, and upon approximately 7,000 acres of land along the great National Parkway in Alleghany, Surry, and Wilkes counties.

RECREATION ON OTHER PUBLIC LANDS

As in the case of the National Forests, the lands containing State and Federal Refuges and fish hatcheries have considerable value as recreational areas. Opportunities for hiking, mountain climbing, camping, picnicking, and study of animal and aquatic life, are afforded.

The principal areas of this type are all the State and Federal Fish Hatcheries, Pisgah National Forest Refuge, the Western North Carolina State Game Refuges, the various county game refuges, and the U. S. Bureau of Fisheries Biological Station at Beaufort.

Plans are now under way to establish picnic areas upon lands occupied by forest fire lookout towers, wherever feasible, in counties co-operating with the State in forest fire control.

MUNICIPAL AND COUNTY RECREATIONAL FACILITIES

The facilities under this classification consist of recreation buildings, camps, amusement parks, parks and playfields, outdoor swimming pools, athletic fields, and golf courses.

A survey of recreational conditions in cities and towns throughout the State shows that the Piedmont region is far ahead of others in the number and excellence of municipal recreation facilities. An industrial region with many towns and cities, it is natural that the Piedmont area with its larger population should lead the less densely settled and predominantly agricultural sections.

As the Emergency Conservation Work Program has functioned in the field of State and Federal developments, the CWA, ERA, and WPA, have set up and completed municipal and county recreation projects in virtually every county in the State. Parks, playfields, swimming pools, recreation buildings, community houses, stadia, ball parks, lakes, and numerous other facilities have gone forward under the comprehensive programs of these Federal relief organizations.

Today, the Works Progress Administration has full-time recreation supervisors operating in 45 counties in this State. Co-operating with county and city officials, these supervisors are setting up definite recreation programs, and securing facilities, wherever possible, to establish units accessible to all citizens of the county.

CWA AND ERA RECREATION ACTIVITIES

The recreational projects of the Civil Works Administration and the Emergency Relief Administration are classified as follows: improvement of grounds, such as grading, installation of drainage facilities, walks, bridle paths, and landscaping; construction of new recreational facilities—parks and playgrounds, golf courses, summer camps, bathing beaches, swimming pools, skating rinks, gymnasiums, etc.; and rural community centers and fair grounds. Projects for improvement of grounds and construction of new recreational facilities varied from \$2,000 to \$100,000 in cost. All projects were sponsored by county and State officials.

The total expenditures of the CWA for recreational projects in North Carolina amounted to \$830,104.42.

Recreational projects completed by the North Carolina Emergency Relief Administration numbered 1,993. The Administration approved expenditures amounting to \$2,676,488.74 for constructing new recreational facilities and repairing those already in existence. Local governments—county and municipal—approved expenditures amounting to \$264,715.49.

WORKS PROGRESS ADMINISTRATION ACTIVITIES

A survey of the recreational projects of the Works Progress Administration reveals that this Administration, up to the fall of 1936, had set up 112 projects in 58 counties and 88 cities in North Carolina. The types of construction and improvements are the same as those undertaken by the CWA and ERA. The total expenditures for recreational projects completed and under construction amounted to \$1,719,724.13.

Combining the expenditures of these three relief organizations, it is found that the total sum spent for recreational projects, principally county and municipal, amounted to \$5,226,317.29 in 1936.

PRIVATE ESTATES AND GARDENS

North Carolina contains many private estates and gardens which are open to the public. The magnificent Vanderbilt estate near Asheville, the Orton plantation, and the Airlee Estate, both near Wilmington, are considered as having the most beautiful formal gardens in the State. Vanderbilt Mansion, built on the order of a French chateau, is considered one of the finest country houses in America. Orton Mansion ranks as one of the finest examples of pure Colonial architecture in the country.

Other noteworthy estates and garden are found in all sections of North Carolina, and are visited annually by thousands of people from this and other states.

MINERAL SPRINGS

Mineral springs are numerous in the State, and are patronized by health seekers from far and wide. The principal types of water are sulphur, lithia, alum, and iron. Though not as popular now as a decade ago, many of these watering places continue to do excellent business and have complete facilities for accommodating large numbers of tourists.

POINTS OF HISTORICAL INTEREST

North Carolina is particularly rich in historical points of interest. Historical markers are now being erected through the cooperation of the State Historical Commission, the Highway and Public Works Commission, and the Department of Conservation and Development.

From the standpoint of public recreational facilities and the development of excellent resort sections, North Carolina ranks high in the nation.

In the development of municipal facilities for recreational purposes, the State lags. This is especially true in the remote western and eastern counties, where practically no facilities are found other than those connected with the public schools. In this respect, it is well to remember that the rural areas of North Carolina, while making great strides in their organization work, such as the Grange, 4-H Clubs, and Future Farmers of America, have to depend almost entirely upon the public schools as meeting places. The establishment of rural agricultural centers throughout the State needs the full attention and co-operation of all local, county, and State agencies.

The recreational program in effect in many of the industrial centers of the Piedmont merits study and emulation by other sections of the State. To name only a few of the organizations that have reached a high degree of development in this area, there are the Hi-Y Clubs, the Junior American Legion Baseball teams, the Y. M. C. A. and Y. W. C. A., Boy and Girl Scout organizations, and many others.

Present public, county, and municipal facilities are rapidly being supplemented by extensive recreational projects of the various Federal relief organizations. The next step for this State to take is unquestionably a comprehensive program of advertising to reach into all sections of the country. A very satisfactory beginning in this direction has been made by the North Carolina Department of Conservation and Development, and it is expected that the program will go forward, expanding from year to year as further recreational opportunities are developed in North Carolina.

CHAPTER XIII

INDUSTRIAL DEVELOPMENT OF NORTH CAROLINA

THE COURSE OF INDUSTRIAL EXPANSION

Throughout her history North Carolina has possessed abundant resources for the establishment of industry. Most important among these are a mild climate, an abundance of water power easily converted into mechanical or electric power, an almost unlimited supply of native-born intelligent labor, an adequate transportation system, and central location with respect to the nation's largest centers of population.

During the Colonial period these advantages were almost completely nullified by English Government which was determined to keep North Carolina, together with the other colonies, a market for British goods. Because of this policy, together with a lack of technical equipment, knowledge and skills natural in a newly developed country, the few manufacturies that appeared were local in character and supplied very limited demand. The one important industry in North Carolina during this period was the production and processing of naval stores. Because she led the American Colonies in the production of tar, pitch, and turpentine, North Carolina was considered by some statesmen of the period to be the most valuable of England's New World possessions.

With the removal of England's restrictive policies through the War of Independence, and the growth of wealth and technical resources, North Carolina as well as the New England States might have been a center of the industrial revolution of the early eighteenth centuries, had it not been for the invention of the cotton gin and power spinning and weaving. Paradoxically enough, this very group of inventions which created industrialism in England and New England virtually prevented industrial development in North Carolina and the South for almost three-quarters of a century, and made devotion to a strictly agricultural economy inevitable. In an age of water transportation, the enormous demand for raw cotton in Great Britain and New England meant a return flow of manufactured goods to cotton growing areas and the ever increasing use of slave labor in the immensely profitable plantation system of cotton production. In North Carolina, as in Virginia, the process was further strengthened by the demand for the other great staple, tobacco.

Thus, the conservative agriculturists of the Tidewater and Coastal Plain areas continued to dominate the State economically and politically until the War between the States. Prior to 1860, only a scattering of industrial pioneers, chiefly in the Piedmont region, tried to arouse popular interest in industrial development. Handicapped by distance from water transport, the lack of north-south railway facilities, and competing with water-borne manufactured articles from the North, they fought tenaciously for survival. Their enterprises, usually small, engaged mainly in the production of semi-finished goods. The small water-powered cotton mills produced only yarns which were woven into cloth on hand looms. A few iron foundries located in mountain coves throughout the upper Piedmont supplied only local markets, although some pig iron was shipped to Baltimore and other centers for finishing. Much the same thing was true of tobacco, food products, and forest products. The bulk of the demand for manufactured goods was met by importation from abroad, from northern industrial centers, or from local production in homes or in the shops of small craftsmen. Practically all of the manufacturing establishments in North Carolina were destroyed during the Civil War.

Among the factors which help to explain the industrial dominance of the Piedmont are: a higher ratio of free white labor to ex-slaves in the early period; a greater degree of contact with northern capital and technology; the declining importance of water transport because of improved north-south rail facilities; proximity to raw materials; central location as to market centers in the north, south, and middle west.

North Carolina's industrial development during the seventy years since the Civil War falls into three stages. From 1865 to 1885, even the Piedmont was too impoverished to undertake manufacturing on an extensive scale. From 1885 to the turn of the century, a moderate expansion of industry based on mechanical water power took place. From 1900 until now, North Carolina has experienced an industrial expansion almost without parallel in modern history.

The four factors most important in this tremendous growth are hydro-electric development, and adequate labor supply, sufficient raw materials, and easy access to markets.

Perhaps the most important factor of the four is cheap and abundant electric power. The State has a developed horsepower of 980,000, and, in addition, a potential 916,000 horsepower available 90 per cent of the time.

Cheap power is matched by an equally important industrial factor—an adequate supply of intelligent labor.

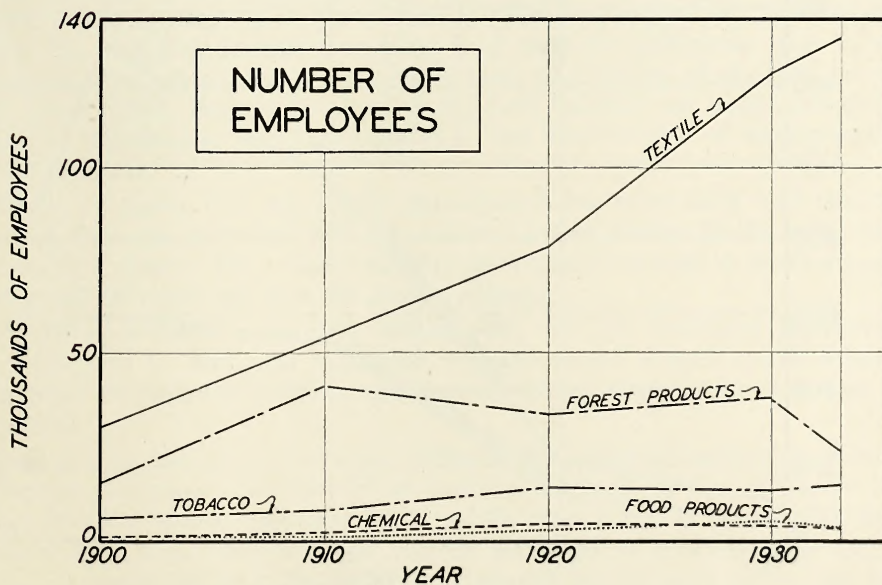
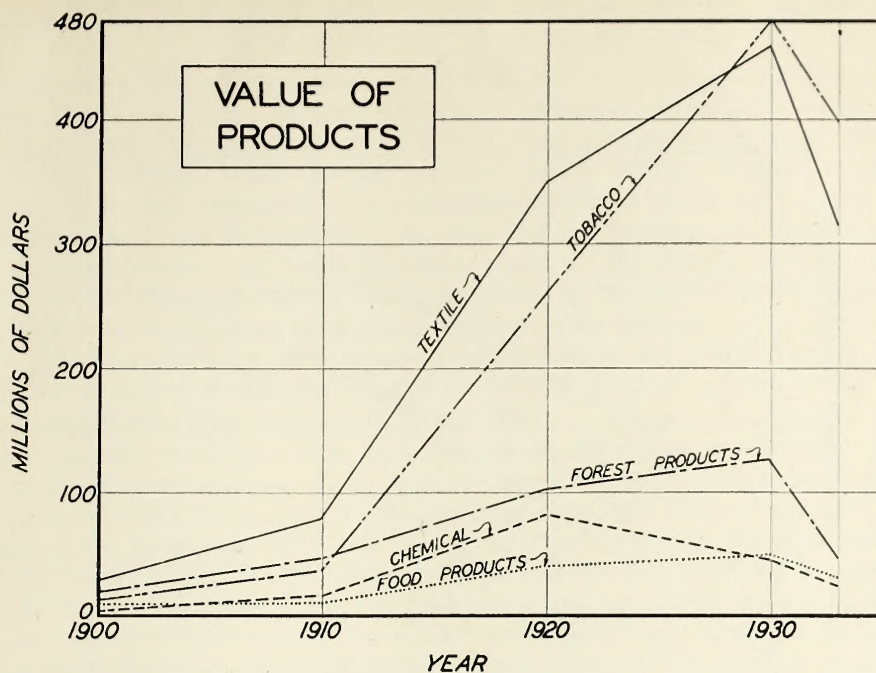
A third factor of basic importance is the State's ample natural resources and supplies of raw material. Cotton and tobacco are the leading agricultural products, while textile and cigarette manufacturing are the two largest industries in the State. The State's forest resources are the primary reason for the prominence of saw mills, planer mills, veneer and plywood producers, furniture factories, and other wood-working establishments, among the State's industries. Although North Carolina industry cannot supply all its raw material needs from within the State, it is favorably located, on the whole, with respect to external sources.

As might be expected, North Carolina's proximity to imported raw materials is matched by her nearness to markets. If a 500-mile circle is drawn with the heart of the Piedmont as its center, it includes well over half the population of the United States and the great majority of the country's concentrated urban markets.

TABLE LIV
DIVISIONS OF INDUSTRY IN NORTH CAROLINA

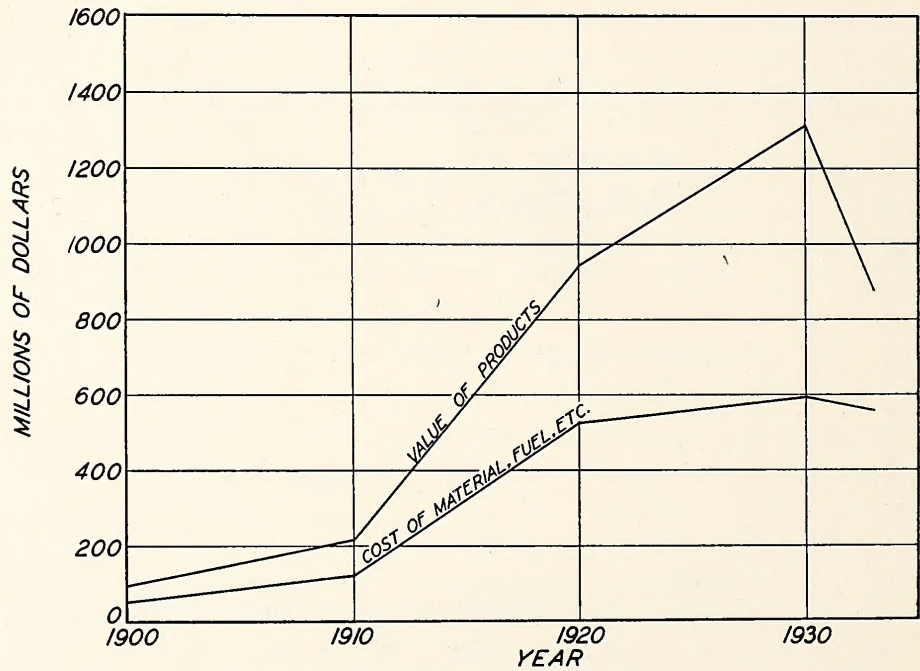
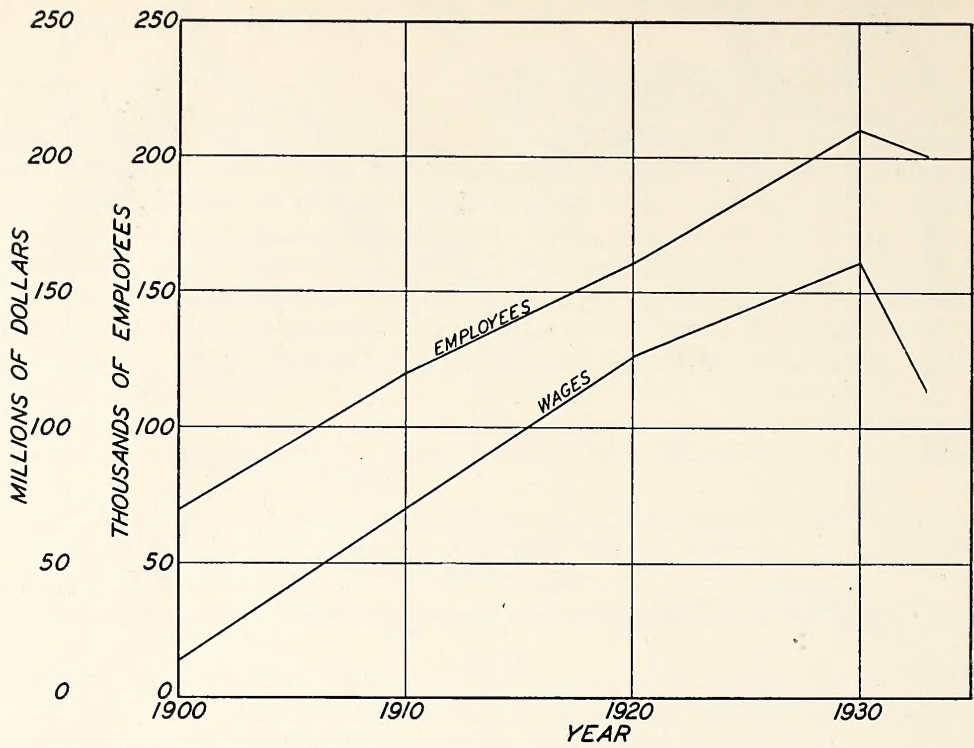
Industry	1880		1933	
	Employees	Value of Products	Employees	Value of Products
Forest Products	4,249	\$4,021,395	24,005	\$ 46,709,502
Textiles	3,330	2,718,009	134,942	314,467,517
Tobacco	3,417	2,113,464	14,899	378,874,920
Food Products	1,388	5,436,920	3,351	25,571,690
Chemical Industry	125	300,000	2,965	23,007,943

According to the last accurate figures available, the ten ranking industries in North Carolina are, in order: (1) tobacco; (2) textiles (including awnings, tents, sails, and canvas covers; men's work clothing, including shirts; cordage and twine; cotton goods; cotton small wares; dyeing and finishing textiles; knit goods; shirts, except work shirts,



NORTH CAROLINA INDUSTRIES

FIGURE 10



ALL INDUSTRIES IN NORTH CAROLINA

FIGURE 11

and nightwear; silk and rayon goods; woolen goods); (3) forest products industries (baskets, boxes; carriages; coffins; cooperage; excelsior; furniture; lumber; planing mills; turpentine; wood turned and shaped); (4) food products industries (beverages; bread; feeds; flour; ice cream; ice manufacture; meat packing; butter; canning and pickling of fruits and vegetables); (5) chemical industries (fertilizers; patent and proprietary medicines; tanning materials; oil, cake and meal cottonseed; natural dyestuffs, mordants and assistants); (6) paper and paper products; (7) leather, tanned, curried and finished; (8) railway repair shops, steam and electric; (9) stone, clay and glass industries (asbestos products other than steam packing; clay products other than pottery; concrete products; slate and other stone products; marble and granite); and (10) machinery, not including transportation equipment. The relative position of the first five named, from 1900 to 1930, is shown by Figure 10.

On Figure 10, it will be noticed that the textile industries consistently employed almost twice as many workers as its nearest competitor, the forest products industries. Comparison with the State totals for all industries for 1900-1933 reveals that, with the exception of the boom year 1930, the textile industries employed approximately 50 per cent of the total number of persons employed during the entire period considered. According to the figures of the North Carolina Department of Labor, the textile industries employ at present 158,504 persons, or 23,562 more than they employed in 1933. The forest products industries consistently held second place in the number employed, as shown on Figure 10. While the furniture division of this industry steadily increased the volume of the other division of this industry as a rule decreased, with a corresponding decline in the number employed. The State Department of Labor figures give the forest products industry 28,356 employees, or 4,351 more employees in 1936 than in 1933. The importance of the tobacco industry is in no way indicated by the number of people it employs. It continuously held third place in industries ranked by the number of wage earners. The chemical industries and the food products industries interchanged their positions in this ranking, due more to fluctuation in divisions of the food industry than to any other factor. Several divisions of the food industry are highly seasonal, so that the number employed is very high relative to the man-months of employment and the value of products.

Figure 10 shows that the textile development was more rapid than that of tobacco until 1928. Between 1930 and 1933, there was a severe decline in the value of products in the textile industry. The tobacco industry, sometimes referred to as the non-depression industry, fell off much less than the textile industry.

Figure 11 presents a graph of employment for the combined industries of the State from 1900 to 1933, and wages for the same period. Figure 11 also shows the relation between the value of products and the cost of material for the combined industries of the State.

The tobacco industry is a major factor in the industrial leadership of Durham and Rockingham counties, while textiles account for the high ranking of Gaston and Mecklenburg. Forsyth County maintains its industrial prominence by both textile and tobacco manufacturing, while furniture and textiles combined give Guilford County its ranking. The concentration of industry in the Piedmont is illustrated by the fact that twelve of the fifteen leading counties, in point of value of products, are in that area. The exceptions, Burke, Buncombe, and Caldwell counties, are all in the Mountain region.

Since the tobacco, textile, forest, food, and chemical industries comprise 92 per cent of the State's industrial volume and employ 89 per cent of the workers, each is discussed separately and in some detail in the following pages.

THE TOBACCO INDUSTRY

The tobacco industry antedates the existence of the corporate State of North Carolina. The Indians who welcomed the various expeditions of Sir Walter Raleigh smoked, in the language of the chroniclers "a noxious weed," tobacco. The manufacture of tobacco has always been closely associated with the economic development of the State. Throughout the Colonial period, North Carolina grown tobacco appeared on the markets of Europe, labeled "Virginia Brights." Commercial manufacture on a large scale began to develop between 1860 and 1880 in Durham, Reidsville, and Winston-Salem. The early manufacturers were principally concerned with the production of cigars, snuff, and chewing tobacco. There were innumerable small establishments in the early tobacco and industry, but far-sighted industrialists saw the advantages of combination, and by 1890 the consolidation of the tobacco industry was under way. The movement toward consolidation continued until around 1910, when a U. S. Supreme Court decision resulted in the dissolution of the American Tobacco Company, Three great companies remained, and all of these were located in North Carolina.

Two-fifths of the entire tobacco crop in the United States in 1934 was produced in North Carolina. Over 40 per cent of all the farms raised tobacco, with an average of 3.9 acres per farm. Farmers market their crop from early fall to late winter, according to the type of tobacco and the belt in which it is grown. After being processed, it is shipped by truck and train to the manufacturing centers. Certain types of tobacco are imported in various quantities to blend with the native product. Fifty-five per cent of the cigarettes manufactured in the United States are made in North Carolina, and the amount of smoking tobacco is almost as large. In addition to growing more tobacco than any other state, North Carolina tobacco establishments manufacture more than half of all the tobacco products of the United States. Today the State of North Carolina is the tobacco center of the world.

The marked growth of the tobacco industry since 1900 is shown in the following table.

TABLE LV
GROWTH OF THE TOBACCO INDUSTRY IN NORTH CAROLINA

Year	Number Establishments	Number Wage Earners	Wage	Cost Material, Fuel, Containers	Value of Products	Value Added by Manufacture
1900.....	80	6,403	\$ 869,107	\$ 4,230,049	\$ 13,620,816	\$ 9,390,767
1910.....	43	8,203	Not Reporting	13,816,000	35,987,000	22,171,000
1920.....	29	14,256	13,100,000	125,770,000	259,824,000	134,054,000
1930.....	8	13,778	11,783,472	139,613,094	480,038,850	340,425,756
1933.....	4	14,899	8,933,962	290,277,775	378,874,920	88,597,145

This table shows that the value of products of the tobacco industry has increased twenty-seven fold in thirty-three years. The number of employees during the same period of time has only a little more than doubled. Since 1900, workers in the tobacco industry in North Carolina have been able to increase the unit of production value because of the great scientific improvements made in machinery. Cigarettes now constitute the principal element of production in tobacco factories, while even as late as 1900 they were only a fractional part of the total production. Hand-rolling was then the only satisfactory method of production, and this was expensive. There was only a small demand for cigarettes prior to the Centennial Exposition at Philadelphia in 1876. Tobacco manufacturers, especially in North Carolina, foreseeing an enormous potential increase in demand if costs could be lowered, experimented continuously with cigarette-making machinery. Although the immediate results of the introduction of successful machines around 1880 was a glutted market, large expenditures for advertising and premiums rapidly increased demand. Table LV shows how the swing to cigarette production and the very rapid improvement of cigarette machinery after 1900 affected the relationship between the number of employees, wages, and value of products. Because the modern cigarette machines produce more than 1,600 cigarettes per minute, the twenty-seven fold increase of value of products since 1900 has not required proportional increases in men or wages.

The increase in the manufacturing of tobacco has been closely paralleled by the increase in the agricultural production of tobacco. In 1900, North Carolina farms produced 127,503,400 pounds of tobacco, while in 1934 the production was 398,549,137 pounds. The increase in production was caused by the increased demand for tobacco by the factories.

Although North Carolina is the leading tobacco manufacturing State by far, she has fewer factories than most of the other important tobacco manufacturing states. This is due to the fact that North Carolina chiefly manufactures cigarettes and smoking tobacco, while in other states the industry produces a much higher proportion of snuff, cigars, chewing tobacco, etc. The highly mechanized process of cigarette and smoking tobacco manufacture, coupled with the necessity for large-scale advertising and marketing, fosters the growth of a relatively few large establishments. It is likely, therefore, that the North Carolina cities, Durham, Winston-Salem, and Reidsville, will remain the most important production centers.

The four establishments listed in North Carolina in the *Census of Manufactures for 1933* manufacture all tobacco products except large cigars and snuff. Tobacco companies frequently own other establishments producing materials used in the manufacture of tobacco. One North Carolina company owns a paper mill in France which supplies all of its cigarette paper. It also owns a mill which makes the tin products which it requires, and a textile mill making tobacco bags, and paper labels, with pure silk hosiery as an auxiliary product. Other companies have interests in companies producing paper boxes in which their products are packed for shipment.

Due to the fact that the large manufacturing establishments are so concentrated that not all the tobacco growers can market their tobacco where the factories are located, the growing regions are divided into 4 belts in which there are 44 tobacco markets and 172 warehouses. The grower hauls the leaf to one of the markets and delivers it at the

warehouse, where it is weighed and tagged. The tobacco manufacturers maintain processing plants where the leaf is stored to age and where it passes through several processing stages. The manufacturers and dealers bid on a competitive basis upon each pile of tobacco, and the grower is paid for his product by the warehouse. Type, grade, and demand, are the controlling factors in the price received.

The present tendency of the tobacco industry is to move closer to the raw material. Because of their present favorable location, North Carolina tobacco industries will be very little affected. Machine production of cigars will eventually place their manufacture in the hands of larger corporations. The costs of the new machinery are almost prohibitive to the small manufacturer, yet the efficiency of these machines means the end of hand production except in the highest grades.

The importance of the tobacco industry to North Carolina can not be over emphasized. It is indigenous to North Carolina, and along with the textile and furniture industries, is responsible for the meteoric rise of the State from one of the unimportant manufacturing states to one of the five highest ranking states.

In 1933, within the State the tobacco industry ranked third in the number employed and first in the value of products. The value of manufactured tobacco was approximately 42 per cent of that of all the products manufactured, while the cost of materials, containers, fuel and purchased electric energy was approximately 50 per cent of the total cost for all industries. The relatively high cost of containers, materials, etc., in the tobacco industry explains why it ranks only third in "value added by manufacture," in contrast to its rank of first in "value of products."

Viewing the industry from a national angle, it represents quite a factor in the internal revenue receipts of the United States government. During the last fiscal year, the government collected in North Carolina \$232,000,000. Also more than \$6,000,000 per annum, in custom charges, is paid by the tobacco industry on goods and commodities shipped into North Carolina from foreign countries.

THE TEXTILE INDUSTRY

North Carolina leads the nation in textile production. Twenty-three per cent of all the active spindles in the United States in August, 1936, were in operation in North Carolina. This same number constituted thirty-one per cent of the spindles in the South. The textile industries in the State employed in 1933, 67 per cent of all the industrial employees in North Carolina, and the products of textile establishments were valued at 27 per cent of the total of products manufactured.

Favorable economic factors in the State are the basis of the textile industry. The tremendous boom given the production of cotton by the invention of the cotton gin in the latter part of the eighteenth century presented opportunities for the establishment of cotton mills, which were quickly seized upon by North Carolinians in the Piedmont area. Several small mills driven by water power were established by 1820, and from time to time others appeared. However, the fact that the dominant agriculturalists refused to encourage manufactures, coupled with frequent labor difficulties caused by white artisans competing with negro slave labor, and other negative factors, prevented the textile industry from assuming an important position in antebellum North Carolina. The post Civil War textile development began around 1870. Today the textile industry offers an unparalleled record of growth from 33 establishments employing 1,776 people

in 1870, to 546 establishments employing 134,942 people in 1933. A factor prominent in this record of growth has been the rapid development of hydro-electric power in the Piedmont and Mountain areas. The availability of cheap power accelerated growth, because power costs are usually from four to six per cent of production costs in textile manufacturing.

The natural resources upon which the textile products industry rests, have undoubtedly been favorable to its growth. North Carolina is one of the leading cotton growing states in the nation, ranking seventh in the number of bales produced in 1934. In yield of cotton per acre, North Carolina ranks first. Much of the cotton grown is of the short-staple variety, for use in the local textile establishments. This necessitates the importation from the deep South of approximately one-half of the raw cotton manufactured. The even climate offers every advantage for all-year production of textiles at low overhead cost, while cheaper housing, clothing and food tends to give southern textile workers advantages not possessed by those in other regions.

The most important products of North Carolina textile mills today are denim, damask, towels, underwear, hosiery, gray goods, plush, yarns, colored goods, silk, rayon, and blankets. With few exceptions out-of-state commission merchants and financial houses market these goods. The State can boast that: Kannapolis has the largest towel mills and Durham the largest hosiery mills in the world; Greensboro has the largest denim mills and Roanoke Rapids has the largest damask mills in the United States; and that Winston-Salem has the largest men's underwear factories in the United States. North Carolina had more spindles in place in August, 1936, than any other state in the Union.

Important divisions of the textile products industry in North Carolina are: cotton goods, knit goods, woolen and worsteds, silk and rayon. In analyzing the present development of the textile products industry, it is well to study each of these divisions with reference to the whole industry. The table given below charts the development of the textile products industry in the past 33 years.

TABLE LVI

THE TEXTILE INDUSTRY IN NORTH CAROLINA, 1900-1933

Year	Number of Plants	Employees	Wages	Cost Material, Fuel, Etc.	Value of Products	Value Added by Manufacture
1900.....	177	30,273	\$ 5,127,087	\$ 17,386,624	\$ 28,372,798	\$ 10,986,174
1910.....	375	53,688	Not Reported	51,263,000	78,291,000	27,028,000
1920.....	447	78,319	55,583,000	206,558,000	351,643,000	145,085,000
1929.....	594	125,226	70,747,164	277,051,758	459,190,402	182,138,644
1933.....	546	134,942	73,730,775	172,931,902	314,467,517	141,535,615

While the number of establishments operating in North Carolina decreased by 48 in the period 1929-1933, the number of employees increased by 9,716 in the same period. Indications are that the peak value of products of 1929 will be equaled in 1936. The ratio

between the value of products and the cost of materials altered sharply in 1933, due to a marked drop in the cost of raw materials.

The production of various divisions of the textile industry in North Carolina in 1933 are shown in Table LVII following.

TABLE LVII
DIVISIONS OF THE TEXTILE INDUSTRY IN NORTH CAROLINA, 1933

Division	Number Plants	Number Employees	Wages	Costs	Value of Products	Value Added by Manufacture
Awnings, tents, sails, canvas covers.....	5	23	\$ 18,614	\$ 68,405	\$ 128,128	\$ 59,723
Men's work clothing (including work shirts).....	12	2,725	1,125,403	3,971,258	5,666,637	1,695,379
Cordage and twine.....	11	1,615	706,374	2,340,900	4,147,194	1,806,294
Cotton goods.....	289	87,709	45,295,229	107,475,979	189,750,739	82,274,760
Cotton small wares.....	8	252	194,415	303,678	808,245	504,558
Dyeing and finishing textiles.....	24	2,899	1,788,138	6,708,748	12,297,341	5,588,593
Knit goods and nightwear, men's	156	28,596	17,607,024	30,775,784	64,091,589	33,315,805
Shirts (except work shirts).....	5	536	157,273	719,230	1,047,233	328,003
Silk and rayon goods.....	29	9,284	6,023,945	18,058,336	31,289,345	13,231,009
Woolen goods.....	7	1,303	814,360	2,509,575	5,241,066	2,731,491
Total.....	546	134,942	\$ 73,730,775	\$ 172,931,902	\$ 314,467,517	\$ 141,535,615

Cotton Goods

The cotton goods industry occupies first place among the individual industries of the State, and is the most important division of the textile industry. This division of the textile products industry in North Carolina is centered in the Charlotte-Gastonia area. Fifty-three per cent of all the establishments employ 65 per cent of the workers and produce 60 per cent of the value of the products.

The cotton goods industry in 1933 used 17,451 cards; 1,347 braiders; 82,299 looms; and 6,898,645 spindles. The five leading counties ranked by type of machinery, are given below.

TABLE LVIII
FIVE LEADING COUNTIES RANKED BY TYPE OF MACHINERY, 1933

Number of Cards	Number of Looms	Number of Spindles	Number Braiders
North Carolina... 17,451	North Carolina... 85,299	North Carolina... 6,898,645	North Carolina... 1,347
Gaston..... 2,481	Cabarrus..... 10,223	Gaston..... 1,461,994	Edgecombe..... 600
Guilford..... 1,419	Guilford..... 8,918	Cabarrus..... 450,644	Burke..... 300
Cabarrus..... 1,196	Mecklenburg..... 8,555	Mecklenburg..... 409,662	Guilford..... 250
Stanly..... 827	Richmond..... 7,295	Guilford..... 317,474	Catawba..... 100
Rowan..... 749	Halifax..... 4,461	Richmond..... 267,752	Montgomery..... 75

Note: According to Bureau of the Census release in August, 1936 there were only 6,037,876 spindles in North Carolina in place.

In the cotton industry in North Carolina, Gaston, Mecklenburg, and Guilford counties are the most important. Gaston County has more spindles than any other county in the Union. The importance of the cotton industry in these counties explains in part their 1933 rank in value of products as third, fourth, and second, respectively.

Many North Carolina cotton goods establishments manufacture only semi-finished material, but the present trend is toward the manufacture of a finished product. Carded and combed cotton yarns of various grades, gray goods, knitting yarns of various thickness, twines, etc., continue to be the principal products of our cotton mills. Statistically, the manufacture of these materials has remained constant, while practically all other divisions have increased. This fact tends to support the statement that the trend in North Carolina is away from the manufacture of semi-finished materials. Further evidence that production is progressing to a more finished stage is found in the tremendous increase in looms in the State for 1925-1935.

Knit Goods

Second in importance to the cotton goods division of the textile products industry is the manufacture of knit goods. The manufacture of hosiery and knit goods is closely allied to the cotton goods industry, the products of the industry being made almost entirely of cotton. This industry is rapidly growing in importance, and North Carolina offers every resource needed for its further development. New establishments in this industry are constantly appearing, and the established plants continue to enlarge and to add employees to their working forces. Since 1925, North Carolina has led all the Southern states in the production of knit goods. The fact that this superiority has been maintained is evidence that the manufacturers of knit goods in North Carolina have been quick to adapt their equipment to the needs of the industry and are intent on strengthening their position in this industry in the nation.

In 1922, North Carolina produced thirty-two million dozen pairs of hose, three million dozen pairs more than its nearest competitor. While most of these hose were all cotton, present trends indicate that a large portion of the hose produced in 1936 will be pure silk and silk-rayon. Gains made in North Carolina in this field in the past five years surpass the gains in any other state. Today manufacturers of silk hosiery in North Carolina claim for their product equality with hose of that type produced anywhere in the United States. Large portions of silk yarn used in the manufacture of this type of hosiery come from Pennsylvania and New Jersey. The rayon used is obtained locally and in nearby states, the South possessing undisputed lead in the field of rayon products.

Other knit goods products are knitted outer garments, knitted underwear, gloves, golf socks, knitted cloth, and many other similar articles.

TABLE LIX
FIVE LEADING COUNTIES RANKED BY TYPE OF MACHINERY

Knitting Machines	Loopers	Ribbers
North Carolina 31,573	North Carolina . . . 5,637	North Carolina 3,108
Guilford 6,030	Guilford 1,209	Catawba 445
Alamance 3,384	Alamance 657	Durham 392
Durham 3,157	Durham 526	Halifax 261
Catawba 2,960	Randolph 500	Alamance 250
Forsyth 2,845	Catawba 447	Surry 227

Due to the lack of figures showing the value of products in this industry by counties, we have shown only the potential production capacity of the leading counties.

Silk and Rayon

In 1933, the production of silks and rayons was the third important division of the textile products industries. As shown in Table LVII there were 29 establishments engaged in the production of silk and rayon goods. These establishments employed 9,284 people, who produced products valued at \$31,289,345. The number of establishments in the silk and rayon industry in North Carolina increases yearly. In the manufacture of rayon and silk, North Carolina ranks third in the nation and first among the Southern states. The leading counties in this industry in North Carolina, ranked by the potential production capacity, are shown in the following table.

TABLE LX
LOOMS AND SPINDLES IN THE SILK AND RAYON INDUSTRY
IN NORTH CAROLINA

Looms		Spindles	
North Carolina	9,483	North Carolina	108,862
Alamance County	3,269	Alamance County	45,330
Forsyth County	1,130	Randolph County	30,000
Cleveland County	768	Cumberland County	12,700
Rockingham County	751	Moore County	11,800
Rutherford County	692	Guilford County	7,000

Approximately 15,000,000 pounds of viscose rayon were produced in North Carolina in 1933.

Other divisions of the textile industry in North Carolina are woolen goods, dyeing and finishing textiles, work clothing, cotton small wares, cordage and twine, and awnings, tents, sails and canvas covers. Table LVII contains statistics on these divisions. The manufacture of woolens and worsteds in North Carolina is confined principally to the manufacture of blankets, although recently several establishments have begun the manufacture of fabrics used in the manufacture of men's suits and overcoats. The dyeing and finishing industry is considerably more important than the statistics indicate, since many of the larger establishments have dyeing and finishing plants connected with the manufacturing establishments.

The textile industry in North Carolina is not evenly balanced. There is a less ready market for the great quantity of coarse yarns produced in North Carolina than there is for the finer yarns and finer grades of goods. The trend in recent years has been toward an increased number of fine yarn mills and an extension of dyeing and finishing plants.

The future is bright for North Carolina textile manufacturers, yet there is room for more diversification in finished manufactured products. The number of finished garments manufactured in the State is small. Only in the case of overalls, underwear and hosiery, does the State attain any rank of importance in production of wearing apparel. Potentially, there is a large field for the manufacture of all types of cotton dresses and men's light-weight suits. We have already a tremendous demand for clothing of this

type. The raw material, the labor, the market, and the equipment are available for production of clothing, and if present indications are to be relied upon, the number of these articles manufactured will be increased.

THE FOREST PRODUCTS INDUSTRY

The forest products industries rank third among the industries of North Carolina. They include: baskets and rattan and willow ware (not including furniture); boxes, wooden (except cigar boxes); brooms, carriages, wagons, sleighs and sleds; caskets, coffins, burial and other morticians' goods; cooperage; excelsior; furniture (including store and office fixtures); lumber and other timber products not elsewhere classified; planing mill products (including general millwork) made in planing mills not connected with saw mills; turpentine and rosin; wood turned and shaped, and other wooden goods not elsewhere classified.

TABLE LXI
DIVISIONS OF THE FOREST PRODUCTS INDUSTRY, 1933

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Baskets, rattan and Willow Ware.....	11	715	\$ 228,157	\$ 854,440	\$ 503,386
Boxes.....	13	610	252,408	1,117,752	402,250
Brooms.....	5	41	20,436	139,116	54,527
Carriages, Wagons, Sleighs.....	3	119	64,900	344,434	151,188
Caskets, Coffins.....	8	190	134,127	806,223	476,500
Cooperage.....	17	163	59,748	346,211	112,290
Excelsior.....	3	38	20,646	104,869	78,826
Furniture.....	101	11,809	6,789,753	26,624,910	13,376,327
Lumber.....	225	8,248	3,039,877	10,935,531	6,660,990
Planing Mills.....	91	1,724	862,461	4,823,403	1,889,086
Turpentine and Rosin.....	3	91	19,566	74,433	44,897
Wood turned and shaped.....	14	257	117,293	538,180	297,310
Total.....	494	24,005	\$ 11,609,372	\$ 46,709,502	\$ 24,065,777

Between 1880 and 1890 the first machine-made furniture was produced in North Carolina. This was also the first in the South, and the factory producing it was located at High Point in Guilford County. From the small establishment at High Point, the furniture industry has developed to a position of importance in the economic life of the State. The rapid development of the furniture industry was accelerated by hydro-electric development which provided plentiful quantities of cheap power. In the beginning of the industry in North Carolina and the South generally hardwood lumber could be obtained at the very doors of the factories. However, the furniture industry grew faster than the forest supply of hardwood, and today the scarcity of the hardwoods presents a difficult problem. Transportation of raw materials 500 to 800 miles is not uncommon

in some southern factories, and from the economic standpoint this is cheaper and more convenient than bringing large numbers of skilled workers to the center of the supply of raw material. Today the materials used in the furniture industry in North Carolina are drawn from all parts of the world.

The furniture industry is by far the most important of the forest products industries. As shown in Table LXI, the value of products of this industry is more than half of the total for the group of forest products industries.

Formerly the production of lumber and semi-finished products was more important than the manufacture of furniture and other finished forest products. The depletion of our forests curtailed those industries, and today the manufacture of finished forest products overshadows the entire industry. The industries manufacturing only semi-finished products have been discussed in the chapter on Forest Resources. In connection with development of the furniture industry, several important industries have been added to the list of forest products industries. Two of these, the veneer and ply-wood industry and the wood turned and shaped industry, owe their importance wholly to the furniture industry. The industries manufacturing caskets, coffins, burial cases and other morticians' goods have developed with the furniture industry. The principal demand for veneers and plywoods and a large part of the demand for planing mill products may be traced directly to the furniture and coffin industries.

The growth of the forest products industry in the past 33 years is shown in the following table.

TABLE LXII
GROWTH OF FOREST PRODUCTS INDUSTRY, 1900-1933

Year	Number of Plants	Wage Earners	Wages	Cost of Material, Fuel, etc.	Value of Product	Value added by Manufacture
1900.....	1,915	15,449	\$ 3,298,407	\$ 10,269,772	\$ 19,302,006	\$ 9,032,234
1910.....	2,887	41,528	Unreported	19,466,000	45,719,000	26,253,000
1920.....	3,079	34,018	28,322,000	40,045,000	100,937,000	60,892,000
1930.....	1,606	38,387	29,839,940	60,436,769	124,587,094	64,150,325
1933.....	494	24,005	11,609,372	22,643,725	46,709,502	24,065,777

From the first establishment in 1880, the growth of the industry was continuous and the type of product constantly improved. From 1914 to 1919 the furniture industry experienced its most rapid development, increasing its output from a valuation of slightly over nine million dollars to more than twenty-eight million, or more than two hundred per cent in five years. The year 1921 showed a falling-off in output, but in 1923 a new peak was set by the output of over forty million dollars. From 1923, new high totals were established each year until 1931. The latter year showed a diminished output, not only because of a decrease in volume, but also because of a sharp decline in price, both brought about by the depression.

In the last census year, 1933, there were 101 furniture factories in North Carolina, employing 11,809 workers, who received \$6,789,753 in wages. The value of the total production was \$26,624,910. According to the 1935 figures of the North Carolina Department of Labor, the number of employees in the furniture division of the forest products industries had increased from 11,809 in 1933, to 15,941. The number of employees in the furniture industry in North Carolina totalled only 6 per cent of the number of employees in the furniture industry in the United States, but they produced 12 per cent of the total value of furniture produced in the United States.

Until early in 1920, North Carolina-made furniture was sold principally on markets in New York, Chicago, and Grand Rapids. At High Point, the furniture manufacturing center of North Carolina, manufacturers undertook to establish a market. A furniture exposition building was completed in June, 1921, at a cost of \$1,200,000. It contains 208,000 square feet of floor space, and for several years was the largest furniture exposition building in the world. Southern furniture manufacturers keep samples of their products on exhibition in this building, so that dealers may visit it and make purchases. Semi-annually, shows are held, drawing buyers from all over the United States. By their collective action, the furniture makers have enlarged their market and thereby benefitted not only themselves but the State at large. The High Point market is today recognized as one of the leading furniture markets of the world.

A tremendous shrinkage took place in the furniture industry from 1929 to 1933. The available indices indicate that the period of contraction is over, and that a new peak is in sight in North Carolina and the nation. Along with the boom now present in the construction industry and the enormous number of new homes being constructed, the furniture industry is enjoying its best year since 1929.

North Carolina is one of the leading furniture manufacturing states in the union. In 1933, North Carolina ranked second in the production of wooden furniture, according to the value of products. The furniture industry of North Carolina manufacturers over twelve per cent of the total wooden furniture produced in the United States, over twenty-three per cent of the bedroom, over twenty-one per cent of the dining room furniture, and over six per cent of the kitchen furniture. In 1933, North Carolina manufactured almost half of the furniture manufactured in the ten Southern states. The value of products for the average North Carolina establishment is considerably higher than that for the average Southern establishment. The North Carolina furniture industry in 1933 employed over forty-nine per cent of the workers, while the worker's average wage was considerable higher than the average wage paid the Southern furniture workers as a whole.

The veneer and ply-wood industry owes its importance to the furniture industry. Panels in most wooden furniture are made of veneer stock and often the heavier and more solid tops of office desks, dressers, and other large pieces have a veneered top surface. The panels in most doors are of veneers. In 1930, a total of 96,417,000 board feet of timber, log scale, was used in the manufacture of veneers in North Carolina. The State ranked second in the number of board feet used by veneer manufacturers.

The future is bright for North Carolina furniture manufacturers. The trend of the market indicates that the demand for good, medium-priced furniture will become heavy in the near future. The valuation of building projects for the first seven months in 1936

is more than three-quarters of the total valuation for 1935, and indications are that building will continue to increase. For the next ten years, it will be necessary to build in the United States an annual average of 400,000 homes, to catch up with our actual needs. This promises well for the furniture industry.

THE FOOD PRODUCTS INDUSTRY

The food products industries ranked fourth in the leading industries of the State. This division of industry in North Carolina includes: beverages (non-alcoholic); butter; fruits and vegetables (canned, pickled and preserved); feed (prepared for fowls and animals); bread and other bakery products; ice cream; ice manufactured; and meat packing (wholesale). These industries furnish employment to many people and utilize large quantities of raw material produced in this State. The following table illustrates the development of the food products industry since 1900.

TABLE LXIII
GROWTH OF FOOD PRODUCTS INDUSTRY, 1900-1933

Year	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
1900	1,773	1,019	\$ 213,627	\$ 8,867,462	\$ 1,648,558
1910	366	1,082	Unreported	10,044,000	1,990,000
1920	718	2,905	24,630,000	38,739,000	9,515,000
1930	693	5,004	4,711,460	48,585,511	19,425,045
1933	397	3,351	2,817,076	25,571,690	11,691,410

Among the states, North Carolina ranks third in the annual value of leading crops. Yet North Carolina sends out of the State annually for food for her people and livestock to the value of 150 to 250 million dollars. Among the commodities imported are corn, wheat, rye, oats, barley, hay, Irish and sweet potatoes, beef and veal, mutton, pork and lard, milk in the form of butter, cheese and condensed milk, poultry, eggs, and many different kinds of canned and pickled goods, including fruits, vegetables, sea-foods, pickles, preserves and jellies.

Varying quantities of each of these are produced in North Carolina and shipped out of the State. But the difference in the value of food produced and the value of food required to feed the people of the State amounts to a sum well over one hundred million dollars. During the summer months truck growers, gardeners and farmers in general supply a considerable portion of the fresh foods consumed by the people, but the non-farm portion of the population must depend upon sources outside of the State for its winter food supply. Many farmers, especially in the cash crop belt, often buy grain and hay for their livestock and food for their families—some of them even during the summer months. Sometimes when the price of cash crops is depressed, as during 1930-32, the diet of many people is so restricted as to cause a noticeable increase in pellagra, anemia, rickets, and other dietary deficiency diseases. This condition is due to an unbalanced agriculture, in which the growing of money crops over-balances the growing of food and feed, and of livestock and livestock products.

In 1929, Governor O. Max Gardner, through appropriate State agencies and departments, started a campaign to bring these facts to the attention of the farmers and to induce them to grow their own food requirements first and make the cash crops secondary. In connection with this effort, attention was also called to the need and opportunity for food processing plants in the State. As a result, in recent years farmers have devoted less acreage to cash crops, and more to food crops. A number of small food processing plants have been established in the past five years. Of course, there have been some plants of this nature in the State for a number of years, but their output has been insignificant compared to the need.

Dairy products manufactured in North Carolina are butter, cheese, and ice cream.

The manufacture of butter on a commercial scale is a comparatively new industry in North Carolina. The first creamery of which there is any record was built in the fall of 1909, and during 1910 creameries were established in Cleveland and Catawba counties. From 1910 to 1929, several establishments appeared. Since 1929, more butter-making establishments have been organized than in any similar period during the State's history.

Early in 1932, a cheese plant was established at West Jefferson, N. C., there being at this time nine establishments in the State making cheese. In 1933 there were 32 ice cream plants in North Carolina, located in the cities.

Commercial canning has never been an important industry in North Carolina. For twenty-five years there have been a few plants in the State, the most of these small as compared with the nation's great canneries. In 1929, the greatest quantity output of the canneries was reached. Canning in North Carolina has grown as an industry, due to the increased attention shown food products during the depression. In 1934 the industries canning and preserving sea food, manufactured products valued at \$1,193,315. This figure represents an increase of one million dollars over the census of 1929 figure. The plants canning and preserving fruits and vegetables, pickles, jellies, preserves, and sauces showed an increase in the value of products amounting to two hundred thousand dollars during the same period. The leading vegetables and fruits canned by these establishments are beans, tomatoes, blackberries, apples, peaches, sauerkraut, cucumbers, jellies and preserves.

Most of these canning plants are small and market their products principally within the State. With such splendid resources as this State possesses, the canning and preserving of sea food, fruits and vegetables should become a great industry.

Grain mills are scattered throughout the State, although many establishments are too small to be reported by the census. There were 69 flour and grain mills reported in 1933. The value of products manufactured was almost eight million dollars. Perhaps the best known flour mills are located in Burlington, Charlotte, Durham, Greensboro, High Point, Lexington, Shelby, Statesville, and Winston-Salem. There is room for much expansion in this industry.

There were 62 bakeries in North Carolina in 1933. These establishments employed around 1,300 people, and produced products valued at five and one-half million dollars.

Other important food products industries include the manufacture of beverages, animal food, ice, and wholesale meat packing establishments.

The efforts and warnings of economists and agricultural leaders are rapidly bearing fruit. Practically all divisions of the food products industries enjoyed their best year in 1935, while activities in 1936 more than equalled the activities for the same months in 1935. Expansion is under way in many of the older establishments.

Taking into consideration the favorable conditions to be found in North Carolina, it may very reasonably be expected that the food products industry is destined to greater and greater importance. Canning, extraction of juice, refrigeration of ripe fruits and other processing of foodstuffs can find here every favorable condition for their development.

TABLE LXIV
DIVISIONS OF THE FOOD PRODUCTS INDUSTRY, 1933

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Beverages	107	615	\$ 568,981	\$ 5,602,632	\$ 3,365,994
Bread	62	1,287	11,152,761	5,573,401	2,870,196
Butter		25	18,999	464,911	95,253
Canning and Preserving Fruits and Vegetables	4	104	36,619	656,581	292,332
Animal Foods	4	42	31,498	619,284	160,048
Flour and other Grain	69	443	316,871	7,594,757	1,772,929
Ice Cream	32	204	215,312	1,967,405	1,048,730
Ice Manufacture	107	579	435,275	2,626,933	1,984,857

THE CHEMICAL INDUSTRY

The value of the chemical industries to North Carolina has frequently been overlooked, yet it has been for thirty-five years one of the five leading industries in the State.

The chemical industry in the South is in a large measure dependent on natural resources such as cotton and forest products. The growth of this industry in the State is shown in the following table.

TABLE LXV
GROWTH OF THE CHEMICAL INDUSTRY, 1900-1933

Year	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
1900	39	991	\$ 242,387	\$ 4,174,496	\$ 696,233
1910	127	2,309	Unreported	15,663,000	4,051,000
1920	156	4,932	4,040,000	80,950,000	20,949,000
1930	159	3,979	2,960,520	44,931,673	12,171,761
1933	140	2,965	1,401,439	23,007,943	9,978,035

Easily the most important phase of the chemical industry today is the manufacture of fertilizer. This industry was built in response to the demand of the southeastern market. Five of the Southern states (North Carolina, South Carolina, Alabama, Georgia, and Florida) use more than fifty per cent of all the fertilizer consumed in the United States, and, since fertilizer is a bulk product, heavy for its value, most of the important mixing plants are located in this area, close to the area devoted to the cultivation of staple crops.

In 1934, the North Carolina fertilizer industry used from the commercial fisheries of the State around eight thousand tons of fish scrap and over four hundred thousand gallons of acidulated fish oil, worth almost seven hundred thousand dollars. Other states supplied almost an equal amount of fish scrap. Other products used were phosphates, cottonseed meal, lime and sulphate of ammonia, tankage, bone meal and blood, sulphur, nitrate of soda, cyanide, castor pomace, and pyrites.

The industries devoted to manufacturing cottonseed oil and meal form the second important division of the chemical industry. There are at the present time approximately 44 cotton oil establishments in North Carolina, with the largest plants located in Charlotte, Raleigh, and Goldsboro. There were two hundred and seventy-nine thousand tons of cotton seed produced in North Carolina in 1934. A good portion of this seed was processed locally and from it cottonseed oil and meal were manufactured. Thousands of tons of cottonseed meal are used annually in North Carolina as fertilizers and animal feed.

The manufacture of patent and proprietary medicines has enjoyed considerable expansion during the past two decades. This industry is the third ranking division of the chemical industry with leading production centers at Raleigh, Durham, and Greensboro.

The other important chemical industries in North Carolina are the manufacture of tanning materials, illuminating and heating gas, and rayon.

Important establishments in the chemical industries of the State appear periodically. The Ethyl-Dow plant at Wilmington, which extracts bromine from the sea water, is one of the latest industries to be established. This plant now provides more than half of the "ethyl fluid" universally used in gasoline mixtures to improve gasoline motor operation.

The divisions of the chemical industry in North Carolina and their relation to the industry as a whole, are shown in the following table.

TABLE LXVI
DIVISIONS OF THE CHEMICAL INDUSTRY, 1933

*Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Fertilizers.....	57	1,354	\$ 534,374	\$ 9,197,123	\$ 2,438,140
Gas, illuminating and heating.....	25	246	287,356	2,472,617	1,839,742
Oil cake and cotton seed.....	41	974	322,926	6,162,876	1,838,262
Patent and Proprietary Medicine.....	12	229	161,920	4,403,824	3,532,981
Tanning Materials, etc.....	5	162	94,863	771,503	328,910
Total.....	140	2,965	\$ 1,401,439	\$ 23,007,934	\$ 9,978,035

Since North Carolina is the leading state in the production of soy beans, there is an excellent opportunity for the development of industries for processing this crop. The State is also fortunate in having the type of climate and soil that is conducive to the growth of peanuts, the processing of which further adds to her numerous industrial activities.

Few states have so varied or so plentiful a supply of raw materials needed by a growing chemical industry. Thousands of acres of forests furnish us with products for lumber, naval stores, charcoal, acetone, industrial alcohol, and paper pulp. Three paper mills in the State manufacture 100 tons of paper pulp daily, rags and waste paper being used in conjunction with the coarser wood products for the finer grades. Other raw materials are livestock; milk products; hides; tan bark; tanned leather; crude oil for refining; workable quantities of gold, iron, tin and copper; huge quantities of mica; feldspar and kaolin for china, porcelain, pottery and enamel ware; talc for cosmetics; rubber filler, asphalt binder, roofing; limestone and silica for glass; fish scrap and gas plant products; and the raw material for the enormous amount of glue used in the annual production of \$30,000,000 worth of furniture.

At present, about one-sixth of the manufactured products of the State are chemical products, and practically all other industries either use chemicals or employ chemical engineering principles. The chemical output for 1933 demonstrates two facts: namely, that the manufacturing of pure chemicals in North Carolina has progressed beyond the experimental stage, and that the conversion of locally supplied raw materials into finished products is highly profitable. The value of products of chemical industries and of allied industries with a non-chemical industry finished product was in 1933: leather, \$6,562,000; ice, \$2,627,000; clay products, \$988,000; cottonseed products, \$6,163,000; fertilizers, \$9,197,123; gas, \$2,473,000; turpentine and rosin, \$75,000; tanning materials, \$772,000; rayon and silk, \$32,000,000. The manufacturing, agricultural and domestic needs of the State at present require large quantities of chemicals, and North Carolina has every factor necessary for the development of the chemical industries: a pure water supply, a ready and active local market, supplies of skilled and common labor, an ample supply of power, a favorable climate, a sufficient transportation system, and a virtually unlimited supply of raw materials.

The other important industries in North Carolina are: stone, clay, and glass; paper and paper products; railway repair shops, steam and electric; machinery, not including transportation equipment; leather tanned, curried and finished. The remaining group, because of the lack of sufficient data, are presented in tabular form. One of the most important of these industries is the stone, clay and glass industry. This industry includes the processing of semi-finished material from mines and quarries, the manufacture of brick and tile, and the finishing of mirrors for the furniture industry. There are more than three hundred minerals in North Carolina, and the extraction and processing of these minerals affords employment to the majority of those employed by the stone, clay and glass industry. Kaolin, clay, mica, feldspar, granite, building stone and paving stone, are mined in considerable quantities in the Piedmont and Mountain regions. Heavy clay products such as brick, tile, pottery, wall coping and sewer pipe are manufactured in practically all portions of the State. The accompanying table shows that in 1933 the manufacture of mirrors and other glass products was the most important of the stone,

clay, and glass industry. The important plants devoted to the manufacture of mirrors and other glass products are located in Statesville, Hickory, High Point, and Winston-Salem.

The mirror industry tends to follow the furniture industry and if present indices are an accurate barometer the furniture industry is going to reach a new height according to the value of products in 1936 and 1937. This augurs well for the mirror and other glass products industries.

TABLE LXVII
DIVISIONS OF THE STONE, CLAY, GLASS INDUSTRY, 1933

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Asbestos Products other than steam packing, pipe boiler covering	5	334	\$ 212,858	\$ 995,294	\$ 435,061
Clay Products other than pottery	27	526	234,334	987,925	647,471
Concrete Products	5	41	13,017	67,111	34,258
Marble, Granite, Slate and other Stone Products	22	370	294,167	888,497	628,121
Mirrors and other glass products	7	178	118,830	1,095,254	370,217
Total	66	1,449	\$ 873,206	\$ 4,034,081	\$ 2,115,128

North Carolina does not have any great publishing center but it does have, in practically every city of considerable size, at least one print shop where a daily or weekly newspaper is issued. There were in 1933 ninety-seven such establishments. The number of newspapers and periodicals issued does not conform to the number of establishments. In many of the larger towns the same establishment prints two or more newspapers and one or more periodicals.

The divisions of the paper and paper products industry are shown in the following table.

TABLE LXVIII
DIVISIONS OF PAPER AND PAPER PRODUCTS INDUSTRY

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Printing and publishing books, music, and jobs	66	665	\$ 671,882	\$ 2,528,244	\$ 1,602,441
Newspaper and periodicals	97	901	1,098,712	6,106,424	5,037,012
Boxes and paper not elsewhere classified . .	12	457	279,223	2,043,393	1,017,250
Photo enlarging not done in printing—est..	5	24	32,488	97,072	83,370
Total	180	2,047	\$ 2,082,305	\$ 10,775,133	\$ 7,740,073

One of the South's largest pulp mills is located at Canton, in Haywood County, North Carolina.

The accompanying tables give data on the divisions of the remaining important industries in North Carolina in 1933.

TABLE LXIX

DIVISIONS OF RAILWAY REPAIR SHOPS, STEAM AND ELECTRIC, INDUSTRY

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Railway repair shops, electric	5	56	\$ 49,675	\$ 83,218	\$ 54,232
Railway repair shops, steam	15	2,987	3,139,625	6,123,796	3,505,494
Total	20	3,043	\$ 3,189,301	\$ 6,207,014	\$ 3,559,726

TABLE LXX

DIVISIONS OF MACHINERY INDUSTRY, NOT INCLUDING TRANSPORTATION EQUIPMENT

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Agricultural implements	5	105	\$ 74,098	\$ 305,068	\$ 218,890
Foundry and Machine Shop products	46	501	404,908	1,255,394	815,808
Textile Machines and parts	21	266	223,104	949,838	610,240
Total	72	872	\$ 702,110	\$ 2,510,300	\$ 1,644,938

TABLE LXXI

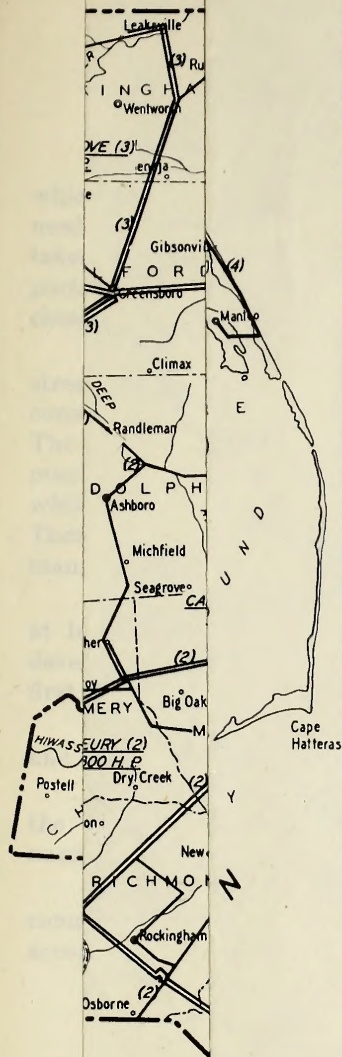
LEATHER, TANNED, CURRIED AND FINISHED, INDUSTRY

Division	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Leather tanned, curried and finished	8	912	\$ 588,225	\$ 6,561,858	\$ 2,530,191

TABLE LXXII

OTHER INDUSTRIES

Industry	Number Plants	Wage Earners	Wages	Value of Products	Value added by Manufacture
Mattresses and Bed Springs	15	204	\$ 125,069	\$ 758,845	\$ 342,883
Transportation Equipment	4	159	105,065	331,847	150,163
Sheet Metal Work	5	19	16,613	143,758	53,182
Structural and Ornamental metal work made in plants not operated in con- nection with rolling mills	9	103	61,326	603,935	266,287
Other	115	11,029	7,187,112	56,591,920	24,481,438
Total	148	11,514	\$ 7,495,185	\$ 58,430,305	\$ 25,293,953



OWNERSHIP

No. XXIII.
ER XV.

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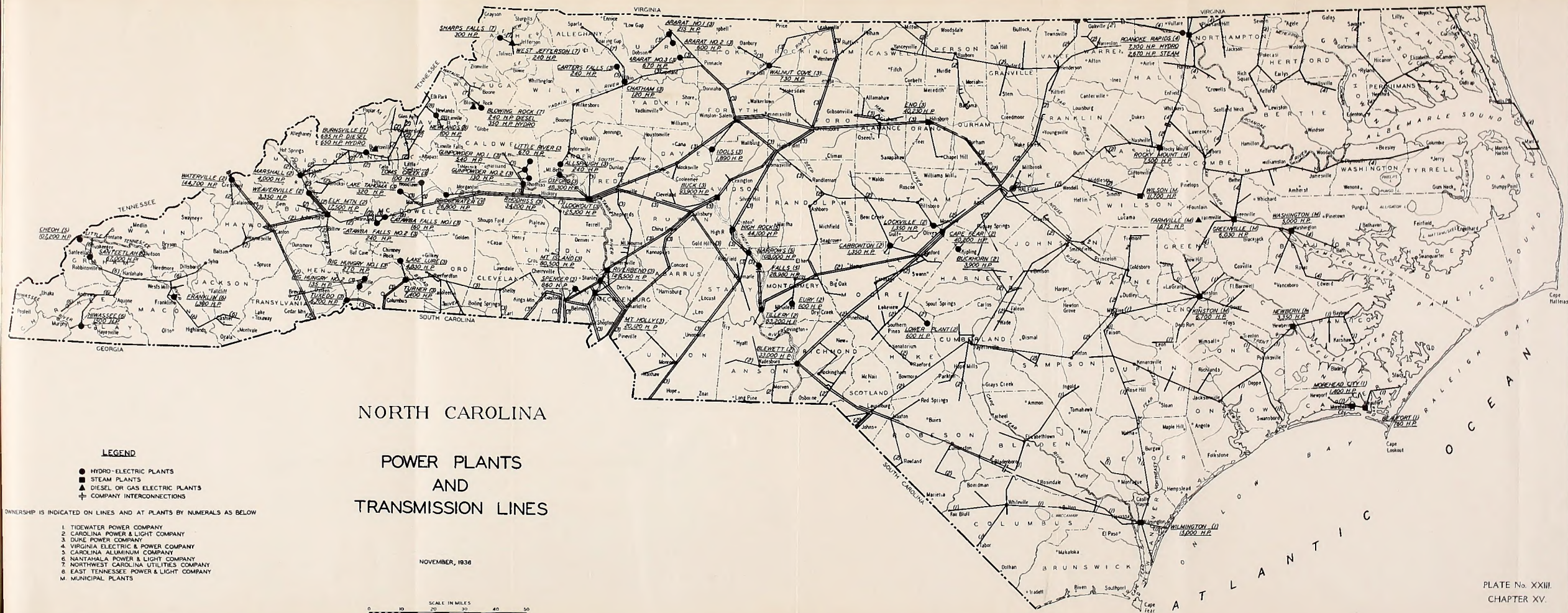
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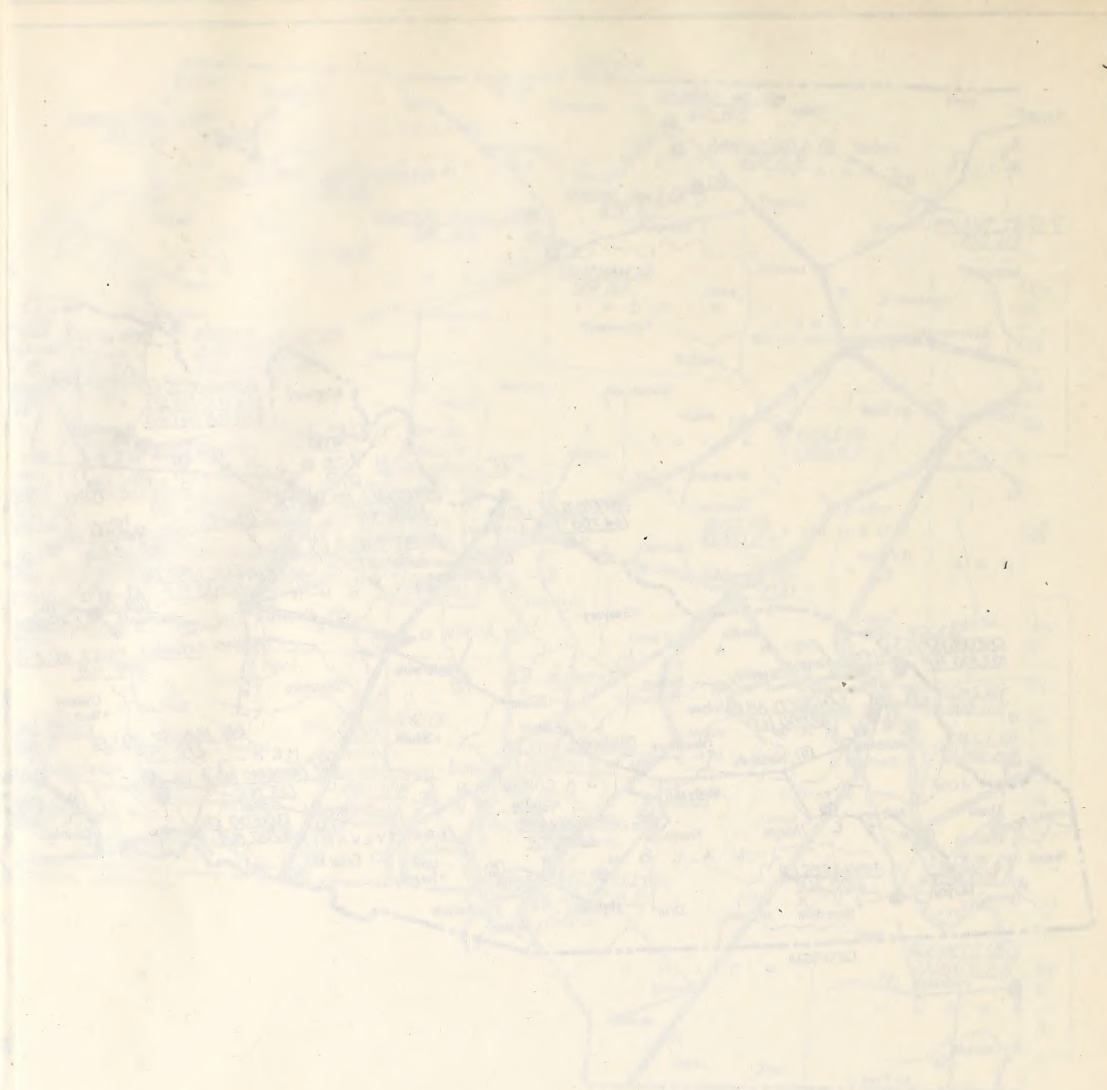
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ANNALS OF TENNESSEE AND THE GREAT SOUTHERN

- OWNERSHIP IS INDICATED ON LINES AND AT PLANTS BY NUMBERS AS BELOW
1. TROOPER POWER COMPANY
 2. CAROLINA POWER & LIGHT COMPANY
 3. NEW YORK COMPANY
 4. VIRGINIA ELECTRIC & POWER COMPANY
 5. CAROLINA ALUMINUM COMPANY
 6. NORTHEAST POWER & LIGHT COMPANY
 7. NORTHWEST CAROLINA POWER & LIGHT COMPANY
 8. EAST TROOPER POWER & LIGHT COMPANY
 9. NORTHERN PLANTS
- LEGEND
- HYDRO-ELECTRIC PLANTS
 ■ STEAM PLANTS
 ▲ DREDGE OR GAS ELECTRIC PLANTS
 ◆ COMPANY INTERCONNECTION

CHAPTER XIV

POWER RESOURCES

POWER RESOURCES OF NORTH CAROLINA

North Carolina may be considered as the center of a Southeastern Power Province, which contains sufficient resources in fuel power and water power to supply its own needs without dependence upon outside sources. The industrial development which has taken place in the last two decades has been largely based upon three factors: transportation facilities, both by rail and highways; labor resources; and power, which is cheap, plentiful, and widely distributed.

In North Carolina, the combination of relatively high rainfall and resulting high stream flow, with favorable topography and foundation conditions for economic dam construction in the Piedmont Plateau, has resulted in large and economical developments. The relatively steep gradients of the rivers and streams of the Piedmont region has made possible an almost complete development of the hydro-electric capacity of these streams, while on many smaller streams, smaller water power developments have been made. These, whether through mechanical or electrical transformation, have been used for many and varied purposes.

From a beginning in 1898 of one small hydro-electric plant on the Yadkin River at Idols, the development has gone forward with great rapidity. The first of the new developments was at the Old Catawba plant near Charlotte, where a fall of 25 feet was first utilized to produce a capacity of 8,000 horsepower.

From this early and small beginning, there has developed an electrical generating and distributing system that reaches every corner of the State.

As reported to the U. S. Geological Survey for December, 1935, only nine states in the Union exceeded North Carolina in total capacity in kilowatts, and only three, namely, California, New York, and Washington, had larger hydro-electric capacity.

At this time there were reported 83 electrical generating plants, operated by 31 companies, with a total capacity of 983,907 kilowatts. This total was distributed according to the type of prime mover, as follows:

Type	Plants	Capacity
Water	49	643,487 Kw.
Steam	22	326,300 Kw.
Internal Combustion	6	3,919 Kw.
Combinations	6	10,201 Kw.
Total	83	983,907 Kw.

This list refers only to plants generating electricity for public use.

These plants generated during the year 1935 a total of 2,319,844,000 kilowatt hours of electrical energy. The monthly production varied from a low value in June of 169,398,000 kilowatt hours, to a maximum of 222,378,000 kilowatt hours in December. Of this total energy production, 2,150,773 kilowatt hours, or 92.7 per cent, were produced by water power.

For the period of twelve months ending October 1, 1936, the production for public use was reported as 2,718,908,000 kilowatt hours, an increase of 17.2 per cent over the January-December total for the year ending December 31, 1935.

The U. S. Geological Survey reports for January 1, 1934, a total of 124 water wheels at water power plants of 100 horsepower or more. Comparison of the reported total capacity with that reported for plants for public use, indicate that there are upwards of eighty plants with a capacity of 87,000 horsepower operating for private power uses.

POWER SYSTEMS

Reference to the accompanying map will show that the principal private utilities producing and distributing electric power in North Carolina are six in number, namely, the Duke Power Company, serving the Piedmont region; the Carolina Power and Light Company, which serves chiefly the central and southeastern sections of the State, but also operates in the territory about Asheville; the Tidewater Power Company, in the Wilmington area; the Virginia Electric and Power Company, serving principally the northeastern section of the State; the Northwest Carolina Utilities Company and the Nantahala Power and Light Company, serving areas in the Mountain section. To these may be added the Carolina Aluminum Company, which has a generating capacity second only to the Duke Power Company, and has connections with other systems permitting delivery of energy when needed.

The Duke Power Company operates the following steam generating stations which are maintained as reserve and to supplement hydro-electric power in periods of high demand.

Plant	Capacity
Eno	40,230 H. P.
Buck	93,900 H. P.
Mt. Holly	20,120 H. P.
Riverbend	147,500 H. P.
Total	301,750 H. P.

This same Company operates twenty-six hydro-electric stations, chief among which are the five plants on the Catawba River:

Plant	Capacity
Bridgewater	26,800 H. P.
Rhodhiss	34,200 H. P.
Oxford Shoals	48,200 H. P.
Lookout Shoals	25,100 H. P.
Mt. Island	80,500 H. P.
Total	214,800 H. P.

In addition to these the Company operates many smaller plants, the capacity of which is given in horsepower as follows:

Turner	7,400	Lake Tahoma	320
Tuxedo	6,700	Big Hungry No. 1	270
Lake Lure	4,830	Carters Falls	240
Idols	1,890	Allspaugh	240
Spencer Mt.	860	Catawba Falls No. 2	240
Walnut Cove	730	Ararat No. 1	215
Little River	670	Catawba Falls No. 1	160
Ararat No. 3	670	Big Hungry No. 2	135
Ararat No. 2	600	Gunpowder No. 2	130
Gunpowder No. 1	540	Chatham	120
Toms Creek	100		

These thirty plants have a combined total capacity of 543,710. Plans are being completed for increasing the capacity of the Riverbend steam plant by addition of new units, adding probably 40,000 horsepower to the capacity of this company.

The Carolina Power and Light Company has two steam plants located at Cape Fear and Elk Mountain, with capacity of 40,200 and 17,500 horsepower, respectively. This Company operates ten hydro-electric plants with a total capacity of 276,250 horsepower. The largest hydro-electric installations are at Waterville on Pigeon River (144,700 H. P.), Tillery on the Pee Dee River (83,200 H. P.), and Blewetts Falls on the Pee Dee (33,000 H. P.) The following minor stations are also operated:

Buckhorn	3,900 H.P.	Marshall	4,000 H.P.
Lockville	1,350 H.P.	Weaverville	3,350 H.P.
Carbonton	1,350 H.P.	Lower Plant	600 H.P.
Eury	800 H.P.		

The Virginia Electric and Power Company now operates one hydro-electric station in North Carolina, at Roanoke Rapids, with a capacity of 7,300 horsepower. A steam plant at Roanoke Rapids with a capacity of 2,670 horsepower is available but not in present use. This Company has extensive connections with other generating stations of their own and of other companies.

The Nantahala Power and Light Company maintains hydro-electric stations at Franklin (1,300 H.P.), and Andrews (1,500 H.P.), and serves other communities in that region. The Tidewater Power Company has steam plants at Wilmington (15,000 H.P.), Morehead City (1,400 H.P.), and Beaufort (760 H.P.) The Northwest Carolina Utilities Company has hydro-electric plants at Burnsville, Blowing Rock, and Sharps Fall with a total capacity of 1,300 horsepower, and Diesel engine plants at Burnsville, Blowing Rock, and West Jefferson with a total capacity of 1,165 horsepower, a total for the Company of 2,465 horsepower.

The Carolina Aluminum Company operates the following plants:

Plant	Capacity
Falls (Pee Dee)	28,980 H.P.
Narrows (Pee Dee)	108,000 H.P.
High Rock (Pee Dee)	44,100 H.P.
Cheoah	107,200 H.P.
Santeetlah	67,000 H.P.

Several cities of eastern North Carolina have developed successful and economic power plants as municipal enterprises. All of these plants have found it necessary to increase their capacities in recent years, and present an interesting example in the field of public operation and ownership of electrical utilities. The most important of this group are listed below, all but Farmville being steam plants.

Plant	Capacity
Wilson	11,700 H.P.
Rocky Mount	7,500 H.P. (2,250 H.P. stand-by)
Kinston	6,700 H.P.
Greenville	6,030 H.P.
Washington	5,000 H.P.
New Bern	3,500 H.P.
Farmville	1,675 H.P. (Diesel)

The Carolina Power and Light Company, the Duke Power Company, the Tidewater Power Company, and the Virginia Electric and Power Company are so inter-connected and have such contracts for exchange of power that the entire system of all four companies may be considered as one system. Three of these also have connections with other systems in adjoining states, which may be called upon for power in case of emergency or shortage and to which surplus power may be delivered.

POTENTIAL POWER DEVELOPMENT

Reference to the foregoing chapter on Water Resources will show that there is a total of nearly 800,000 horsepower potentially available on the basins there enumerated. The Corps of Engineers, U. S. Army, have completed surveys and studies on all the streams of the State, and have estimated the power possibilities to be found thereon. According to their estimates, corrected for sites since developed, there is 1,035,000 horsepower of undeveloped water power in the State.

It should be noted here that the extraordinary advances made in recent years in the efficiency of steam-power production makes necessary a careful appraisal of the economies possible by a combination of hydro-electric and steam electric installations. Considering that the unit coal consumption average for all plants in 1933 had fallen to 46 per cent of the 1919 average, and that every year shows a steady increase in fuel efficiency, the possibilities of steam power development made co-ordinately with hydro-electric development as parts of an interconnected system are found to be increasingly indicated.

Having regard also to the current multiple demands on stream flows for navigation, for dilution of municipal and industrial wastes, the location of a proposed power plant must take into consideration many factors. The location relative to the center of power demand, its adaptability to the load characteristics of the market it is to serve, the accrued carrying charges on the investment while awaiting the development of this market, and the effect of its water use on the water supply for other demands, are some of the more important factors to be considered.

Adequate consideration must be given also the relation of the power development, not only with the other resources of the State, but also for the larger region of which the State is only a part. Power distribution knows no state boundaries.

RATES FOR ELECTRICAL SERVICE

The following schedules are offered to show prevailing rates for domestic service by three of the larger Public Utility Companies.

To illustrate the comparison between the rates for various monthly consumption of electricity, the following table has been prepared:

TABLE LXXIV
COMPARATIVE RATES FOR MAJOR POWER COMPANIES IN NORTH CAROLINA

Electricity Used	Car. P. & L. Co.	Tidewater P. Co.	Duke P. Co.
10 Kwh.	\$ 1.00 (M)*	\$ 1.00 (M)*	\$.80 (M)*
50 Kwh.	3.00	3.55	2.50
100 Kwh.	5.00	5.30	3.75
200 Kwh.	7.50	7.80	6.25
300 Kwh.	9.50	10.05	8.75
500 Kwh.	12.50	14.05	13.75
1,000 Kwh.	20.00	24.05	26.25

*Minimum monthly charge.

The following figures show prevailing rates for commercial and industrial service by the larger Public Utility Companies:

DUKE POWER COMPANY

80 cents for first 10 Kwh. or less used
 4.5 cents per Kwh. for next 90 Kw. hrs. used
 4 cents per Kwh. for next 400 Kw. hrs. used
 3 cents per Kwh. for next 500 Kw. hrs. used
 2.5 cents per Kwh. for next 1,000 Kw. hrs. used
 1.9 cents per Kwh. for next 2,000 and over Kw. hrs. used
 Monthly Minimum Charge: 80 cents

CAROLINA POWER AND LIGHT COMPANY

6.5 cents per Kwh. for first 150 Kw. hrs. used
 5 cents per Kwh. for next 750 Kw. hrs. used
 4 cents per Kwh. for next 1,500 Kw. hrs. used
 3 cents per Kwh. for all additional Kw. hrs. used
 Monthly Minimum Charge: \$1.00

TIDEWATER POWER COMPANY

8 cents per Kwh. for first 50 Kw. hrs. use billing demand
 6.5 cents per Kwh. for next 50 kw. hrs. use billing demand
 4 cents per Kwh. for next 1,000 Kw. hrs. used
 2.5 cents per Kwh. for all additional Kw. hrs. used
 Minimum Charge: \$2.00 per month per Kw. of billing demand but not less than \$1.20

VIRGINIA ELECTRIC AND POWER COMPANY

6.5 cents per Kwh. for first 100 Kw. hrs. used
 5.5 cents per Kwh. for next 150 Kw. hrs. used
 4 cents per Kwh. for next 450 Kw. hrs. used
 3.25 cents per Kwh. for next 1,500 Kw. hrs. used
 2.75 cents per Kwh. for next 7,800 Kw. hrs. used
 1.5 cents per Kwh. for next 15,000 Kw. hrs. used
 1.125 cents per Kwh. for excess of 25,000 Kw. hrs. used

RURAL ELECTRIFICATION

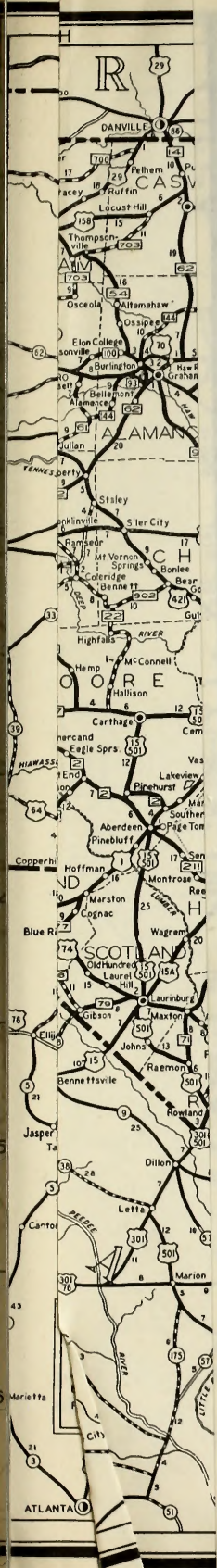
In 1934, the North Carolina Rural Electrification Survey, under the direction of a Committee, appointed by Governor J. C. B. Ehringhaus, of which Dr. Clarence Poe of Raleigh was Chairman, made a survey of the entire State to determine the possible extension of rural electric service. The survey, made under the direction of D. S. Weaver and C. W. Burton, Assistant, was comprehensive, and the following figures are taken from the revised summary of that survey:

Number of Lines Surveyed	1,011
Length of Surveyed Lines, Miles	6,001.6
Total Number Interested Prospects	32,058
Connected Load (Estimated)	104,939 Kw.
Cost of Construction (Estimated)	\$9,912,888
Annual Revenue (Estimated)	\$1,058,572
Annual Power Consumption (Estimated)	15,810,177 Kw. hrs.
Average Ratio Cost to Annual Revenue	9.36

The General Assembly of 1935 created the North Carolina Rural Electrification Authority, which was organized and began work under the direction of Mr. Dudley Bagley. The same Legislature passed acts authorizing the formation of Membership Electrification Corporations, and provided laws permitting co-operation with the Federal Rural Electrification Authority. With the co-operation and direction of the State Authority, the Public Utility Companies, Municipalities, and the Membership Corporations have rapidly extended their construction of rural power lines in the State, as shown by the figures on the following page.

Total Miles of Line Built		1,879.71
By Public Utility Companies	1,439.57	
By Municipalities	393.54	
By N. C. FERA	22.60	
By Lees-McRae College	4.00	
By Co-operatives	20.00	
Lines Under Construction		629.08
By Public Utility Companies	452.58	
By Municipalities	8.50	
By Co-operatives	40.00	
By Tidewater Power Company	128.00	
Lines Authorized		2,118.01
By Public Utility Companies	1,158.51	
By Municipalities	27.60	
By Co-operatives	931.90	
Total Mileage All Lines		4,626.80
Total Construction Cost (Estimated)		\$4,897,269.98
Total Customers Served		26,062
By Lines Built	10,452	
By Lines Building	3,777	
By Authorized Lines	11,833	

It will be seen by these figures that the rural power lines already built, under construction, and authorized, are 77.9 per cent of the length of lines surveyed in the original investigation. This is significant as measuring both the successful activity of the State Authority and the desire of the rural people for the benefits of electric service. This necessarily involves a tremendous expenditure on the part of these 26,000 new customers, for house wiring and fixtures and for the purchase of electric farm and home equipment, such as radios, refrigerators, and household appliances.



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CHAPTER XV

TRANSPORTATION AND COMMUNICATION

HIGHWAYS

One of the fundamental requirements for the development of the resources of any area is an adequate system of transportation. In this respect, North Carolina may undoubtedly be classed as one of the most progressive states of the Union.

At the beginning of the present century the transportation facilities consisted principally of railways, of which there was a network of lines reaching almost every section of the State. This was supplemented by a limited mileage of navigable streams along the coast, chiefly on the Roanoke, Neuse and Cape Fear rivers, and the coastal sounds. Wilmington, New Bern, and Washington were the chief shipping points, Wilmington far outranking the others. Paved or hard surface roads were few and far between, and limited to the larger cities and for short distances therefrom.

As late as 1911, out of an estimated mileage of public roads of over 48,000 miles, only 1,175 miles were macadamized, while 1,502 miles of sand-clay and 683 miles of gravel road were reported. At this time less than 90 miles of roads with special surfaces were in existence, and these were located in eight counties.

Due to the continued efforts of the Good Roads Association, beginning in 1905, interest in good roads slowly developed until in 1911 the Legislature provided for the "Central Highway," extending from Morehead City to Tennessee. The first State Highway Commission was appointed in 1915, but because of limited appropriations acted only in an advisory capacity.

Real highway construction began with the passage of the 1919 Highway Law, which greatly increased the financial resources for highway building. This Commission, in the two years of its existence, completed 200 miles of improved highways and started construction on 650 miles. In 1921, the Highway Commission was enlarged, its duties changed and a bond issue of \$50,000,000 authorized for construction purposes.

Thus was begun the gradual transfer of responsibility for both construction and maintenance of public roads, from the local communities to the county, and from the county to the State. North Carolina is now the only State in the Nation which maintains all public roads without resort to a tax on property.

Since the State began the construction of public roads and highway structures necessary in connection therewith, a total investment of more than \$210,000,000 has been made in the primary roads, through the close of the fiscal year, June 30, 1936. These funds were derived as follows:

Bond Sales	\$115,000,000.00
United States Government	41,832,888.10
Contributions	11,796,000.47
Loans from Counties, net balance	2,151,001.46
Surplus from State Revenue	39,984,321.92
Total	\$210,764,211.95

The bonds issued for road purposes are being paid serially, out of revenue derived from taxes on the sale of gasoline. The last bond issue for these purposes was that of 1927, in the amount of \$30,000,000. The reduction of this debt has been steadily accomplished. At present \$92,796,000 is outstanding of these obligations, with a sinking fund of \$8,369,827, making the net bonded State debt for highways \$84,426,173.

In the tables given below, the State Highway System is considered to include the numbered routes of principal highways as shown on the State Highway Map attached hereto. The total length of these roads, of all types of surface, is 11,066.51 miles.

The county system represents those roads which are included within the so-called County Road System of the State. These highways are not numbered and are not shown on the map of Highways above referred to. The expenditures listed above are the expenditures for the State System solely.

TABLE LXXV
NORTH CAROLINA HIGHWAY SYSTEM

Type Surface	State (Miles)	County (Miles)	Total
Unimproved	197.15	9,943.55	10,140.70
Graded	618.15	19,963.16	20,581.31
Topsoil or Sand Clay	1,666.46	14,533.63	16,200.09
Gravel	332.70	1,144.30	1,477.00
Shale	55.10	70.10	125.20
Traffic Bound Macadam	106.02	409.40	515.42
Oil Treated	2,353.01	563.62	2,916.63
Surface Treated Gravel	337.70		337.70
Surface Treated Macadam	514.12	24.60	538.72
Penetration Macadam	84.20	121.15	205.35
Brick	9.40	32.60	42.00
Asphalt	1,828.55	168.15	1,996.70
Concrete	2,702.09	168.79	2,870.88
Bridges over 500 feet in length	22.13	2.50	24.63
In cities	239.73		239.73
Total	11,066.51	47,145.55	58,212.06

As a result of this remarkable era of highway improvement, almost every section of the State is now accessible throughout the entire year, over improved all-weather roads. There remain now only a few sparsely settled areas into which these modern highways do not reach. Some areas present unusual engineering difficulties which have first to be overcome.

For example, in the eastern part of the State, the sounds and wide rivers penetrate deeply into the land area, and dependence was formerly placed upon ferries for crossing these waters. At first private interests built bridges across the Chowan River, Currituck and Roanoke sounds, and Wrightsville Sound, leading to Wrightsville Beach. These and many other such toll conveniences have now been purchased by the State and made free, thus greatly facilitating travel to and from the regions formerly somewhat isolated. Similarly in the mountain areas, where road location and construction is more difficult and expensive, roads have been built into every county and to all important communities, until all are now readily accessible by automobile.

With the rapidly increasing automobile traffic, important roads have been straightened and widened, timber structures replaced by concrete and steel bridges and viaducts, curves eliminated, obstructions removed, roadsides beautified and landscaped, unsightly and eroding side slopes have been flattened, culverts widened, ditches reconstructed, until the entire system merits and receives praise from all users.

Not the least significant fact about this highway development is the high degree of technical skill employed, which has resulted in the use of the best materials, excellent and economic design, and honest construction. The faithful performance of public duty, over a long period of time and involving the expenditure of a vast sum of money, with no

slightest suggestion of impropriety, has set a high standard of public service. While many men have given loyally and untiringly of their time and thought, none gave more zealously or splendidly than Frank Page, for more than ten years Chairman and chief executive officer of the Highway Commission. It is very fitting that the 1935 General Assembly appointed a Commission to erect a memorial in his honor.

Perhaps the most striking development in the highways of the State at the present time is the building of the Parkway in the mountains of western North Carolina. Designed to extend from the Shenandoah National Park in Virginia, to the Great Smoky Mountains National Park, this scenic highway will follow along the very highest part of the Blue Ridge Mountains to the Smoky Mountains, thence into Tennessee. Some of the finest mountain scenery in the United States will thus be brought within reach of every traveller who may desire to use and enjoy the privilege. Sufficient right-of-way has been obtained on either side of the road to insure the development of a true Parkway. Much of the road is now under construction, and when completed, this will become one of the greatest scenic resources of the State.

Similarly in the eastern part of the State, roads are being developed, reaching to hitherto almost inaccessible areas along the barrier reefs and the areas bordering on the Pamlico and Albemarle sounds. Thus will soon be opened up, even more than at present, one of the finest game fishing and hunting areas in the country. Long a sport which only a few could have the means to enjoy, good roads have now made this the common privilege of all.

Included in the highway system of the State are of course the important North-South and East-West Federal Highways, upon which tourists in ever increasing numbers and from every part of the country come, to enjoy the splendid climate, interesting historical and scenic points, and the many resorts to be found in North Carolina.

But still more significant for the development of the Commonwealth is the vast network of county roads reaching to the farms, mines, and forests, bringing not only a greater development of natural resources but bringing also to the rural people the possibility of a life richer in opportunities for a higher standard of culture and in social contacts.

The next great necessity will be the permanent improvement of the lesser roads, and the increased problems of maintenance of existing roads.

To these tasks, the State is now addressing its attention. North Carolina may well be called "A Good Roads State."

MOTOR TRANSPORTATION

Close upon the completion of through routes on the highways came the development of motor freight and passenger services. Here as elsewhere these lines have been keen competitors to the railroads, and have become important carriers for short-haul service on all commodities and have made heavy inroads in the long-haul traffic in many commodities, particularly in less than carload lots.

There are now sixty-six licensed public motor freight and passenger companies with established routes engaged in intrastate operation. Of these, twenty-four provide passenger service on regular schedule, under the supervision of the State Utilities Commission. At least four of the motor lines are owned and operated by railways, in conjunction with their rail operations.

Many of these bus lines serve to supplement the railroad service in reaching into isolated regions, and provide alternative shipping facilities for many communities of the State. Included in the list also are many through passenger and freight lines engaged in interstate traffic service, giving almost all parts of the State access to the north, south, and west.

RAILWAY TRANSPORTATION FACILITIES

One important factor in the rapid industrial development of North Carolina has been the excellent system of railroads which covers the State and reaches into practically every county. Three great trunk lines, the Atlantic Coast Line Railroad, the Southern Railway, and the Seaboard Air Line Railway, extend entirely across the State, and have numerous branch lines connecting with their main lines.

The Norfolk Southern Railroad crosses the center of the State in a general east and west course, extending from Norfolk to Charlotte. Two other important trunk lines have branches in the State, while there are now more than thirty independent short lines operating wholly within the State.

It will thus be easily seen that North Carolina compares favorably with other southern states with reference to rail transportation. The railroads have shared the experiences of roads in other sections, in reduction of freight and passenger traffic, necessitating decrease in rail mileages. Several short lines have been entirely abandoned, but the total mileage of railroads in the State has not changed greatly.

The tabulation given below gives outstanding facts concerning the railways:

Total Operated Mileage, December 31, 1933	5,246.93
Main Track Mileage	4,800
Cost of Road and Equipment	\$ 300,962,900
Funded Debt	126,216,375
Capital Stock	99,181,758
Operating Revenue	47,306,264
Net Operating Income	10,815,609

Studies made on ten of the principal roads, involving 4,229.23 miles of operated track, for the year ending December 31, 1933, show the following facts:

Revenue Ton-Miles	2,556,789,526
Revenue Ton-Miles per mile of road	604,528
Number Revenue Passengers	2,131,635
Revenue Passenger-Miles	163,822,041
Number Revenue Passengers carried one mile	3,166
Revenue Passenger-Miles per mile of road	38,735
Percentage Total Mileage in Study	81

The Atlantic Coast Line reaches approximately thirty counties in the eastern portion of the State, operating 1,053 miles of main track, of which the Company owns outright 1,010 miles. The Seaboard Air Line Railway operates approximately 628 miles of main track, all of which it owns. The Southern Railway has a total operating mileage of 1,080 miles of main track.

The Norfolk-Southern Railway now operates 814 miles, of which 628 miles is owned outright.

The Norfolk and Western Railroad enters the State in two places, connecting to Durham from Lynchburg, and to Winston-Salem from Roanoke. These two lines represent 112 miles of main line track, all owned by this Company.

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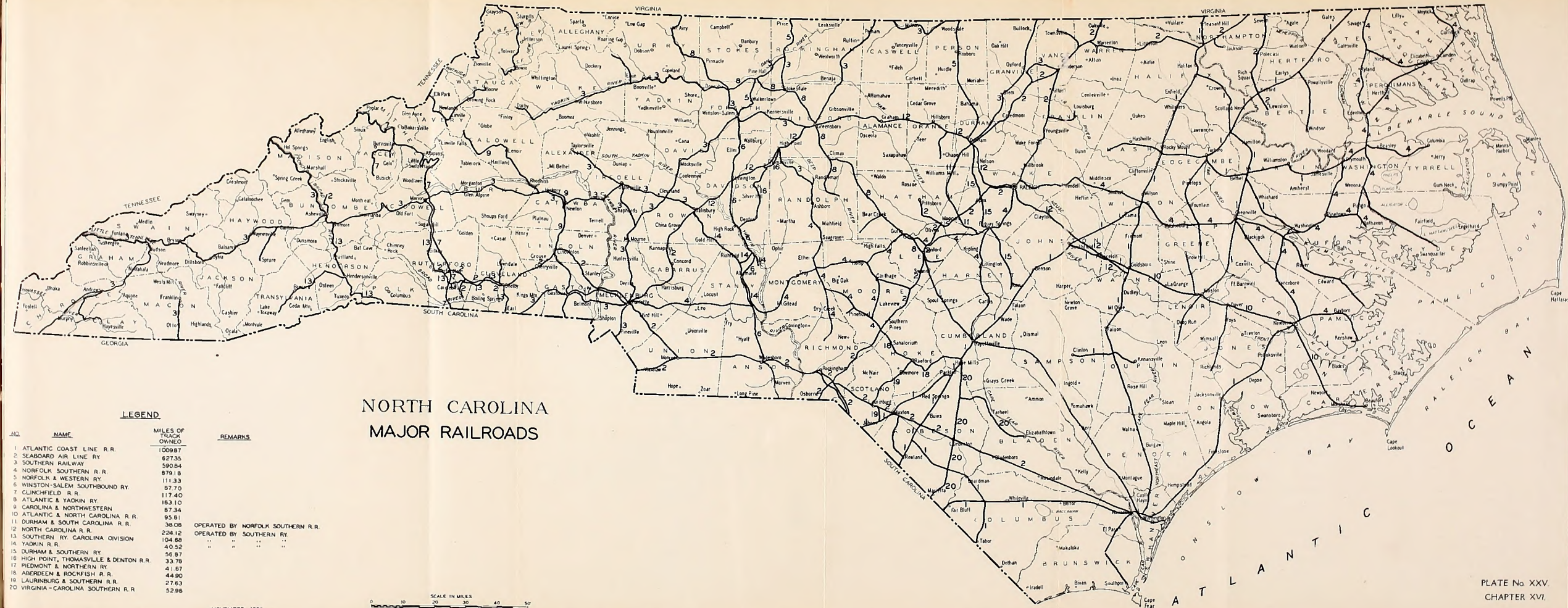
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LEGEND

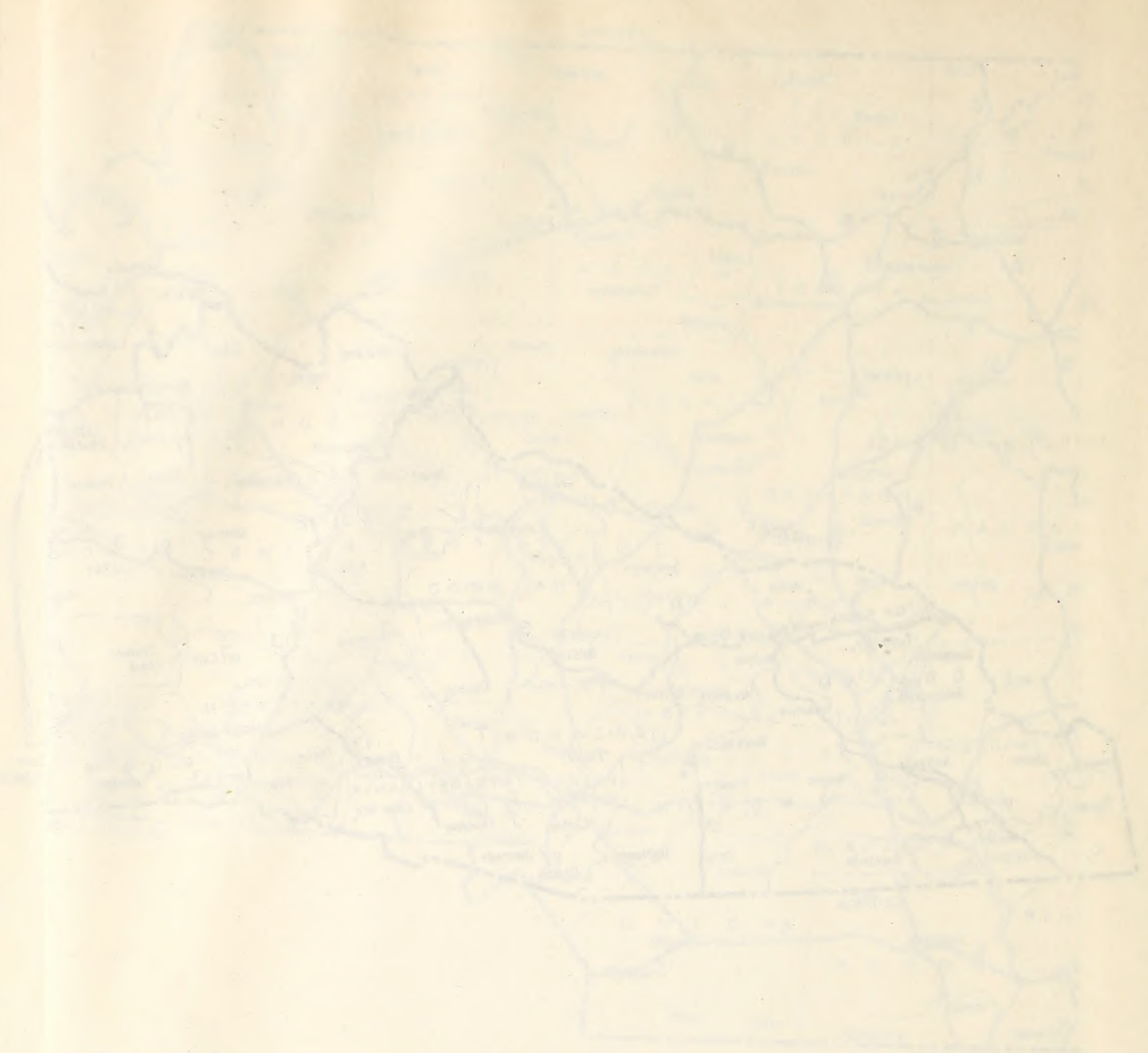
NO.	NAME	MILES OF TRACK OWNED
1	ATLANTIC COAST LINE R.R.	1009.87
2	SEABOARD AIR LINE RY.	627.35
3	SOUTHERN RAILWAY	590.84
4	NORFOLK SOUTHERN R.R.	879.18
5	NORFOLK & WESTERN RY.	111.33
6	WINSTON-SALEM SOUTHBOUND RY.	87.70
7	CLINTONFIELD R.R.	117.40
8	ATLANTIC & YADKIN RY.	183.10
9	CAROLINA & NORTHWESTERN	87.34
10	ATLANTIC & NORTH CAROLINA R.R.	95.81
11	DURHAM & SOUTH CAROLINA R.R.	38.08
12	NORTH CAROLINA R.R.	228.12
13	SOUTHERN RY. CAROLINA DIVISION	104.60
14	YADKIN R.R.	40.52
15	DURHAM & SOUTHERN RY.	56.87
16	HIGH POINT, THOMASVILLE & DENTON R.R.	33.78
17	PIEDMONT & NORTHERN RY.	41.67
18	ABERDEEN & ROCHFISH R.R.	44.90
19	LAURINBURG & SOUTHERN R.R.	27.63
20	VIRGINIA-CAROLINA SOUTHERN R.R.	52.86

OPERATED BY NORFOLK SOUTHERN R.R.
OPERATED BY SOUTHERN RY.
" " " " " "

NORTH CAROLINA
MAJOR RAILROADS

SCALE IN MILES
0 10 20 30 40 50

NOVEMBER, 1936



GA. RAILROADS

LEGEND

RAILROADS IN OPERATION
RAILROADS UNDER CONSTRUCTION

NO.	NAME	LENGTH MILES
1	ATLANTA & NORTH ATLANTA R.R.	10.00
2	ATLANTA & SOUTH ATLANTA R.R.	10.00
3	ATLANTA & WEST ATLANTA R.R.	10.00
4	ATLANTA & EAST ATLANTA R.R.	10.00
5	ATLANTA & CENTRAL ATLANTA R.R.	10.00
6	ATLANTA & NORTH ATLANTA R.R.	10.00
7	ATLANTA & SOUTH ATLANTA R.R.	10.00
8	ATLANTA & WEST ATLANTA R.R.	10.00
9	ATLANTA & EAST ATLANTA R.R.	10.00
10	ATLANTA & CENTRAL ATLANTA R.R.	10.00
11	ATLANTA & NORTH ATLANTA R.R.	10.00
12	ATLANTA & SOUTH ATLANTA R.R.	10.00
13	ATLANTA & WEST ATLANTA R.R.	10.00
14	ATLANTA & EAST ATLANTA R.R.	10.00
15	ATLANTA & CENTRAL ATLANTA R.R.	10.00
16	ATLANTA & NORTH ATLANTA R.R.	10.00
17	ATLANTA & SOUTH ATLANTA R.R.	10.00
18	ATLANTA & WEST ATLANTA R.R.	10.00
19	ATLANTA & EAST ATLANTA R.R.	10.00
20	ATLANTA & CENTRAL ATLANTA R.R.	10.00

Other smaller lines operating more than fifty miles of track are shown below:

Company	Miles Track Operated
Carolina and Northwestern Ry. Co.	87
Clinchfield Railroad Co.	117
Yadkin Railroad Co.	51
Winston-Salem Southbound Ry. Co.	90
Durham and Southern Ry. Co.	57
Virginia and Carolina Southern Railroad Co.	53

It is interesting to note that the Atlantic Coast Line Railroad, the Seaboard Air Line Railway, and Southern Railway reach many other Southern States and have direct lines or connections to Washington, D. C., and other northern points.

Connections through the Norfolk and Western Railway and by the Southern Railway to Tennessee points, give outlet to western lines, additional outlets in this direction being over the Virginian Railway and the Chesapeake and Ohio Railroad, to the Ohio Valley. The Southern Railway reaches as far west as Chicago, through ownership of half interest, with the Louisville and Nashville Railroad, in the Monon Line, operating between Louisville and Chicago. The Atlantic Coast Line Railway, since it owns a controlling interest in the Louisville and Nashville Railroad, has this same advantage.

This is important to the State, since these two connecting southern lines permit direct competition, in reaching this great western market area, with transcontinental lines from eastern metropolitan centers.

RAILROAD RATES

North Carolina lies in the Southern Region as far as rate structures go, the Official Classification Territory including only the rail lines across the southern part of Virginia. For many years, therefore, the South has had to overcome an adverse differential as compared to states in the northern freight rate area.

However, since freight rates on shipments from the South into the Official Classification Territory, are composite rates representing the proportionate distances in areas of high and low rates, North Carolina has always enjoyed the advantage of her relatively close location to Official territory. Thus the proportion of high tariff haulage in North Carolina, for shipments out of the State has been lower than that for states to the south, making the average total rate smaller than for other southern states. Since the Interstate Commerce Commission has had control over intrastate rates as well as interstate tariffs, rates on east-west intrastate shipments have also been relatively higher in many cases than out-of-state shipments to these same points. Recent decisions of the Interstate Commerce Commission, relative to the continuance of emergency intrastate rates, point to the hope that the adverse rate differential under which the Southern Region has been forced to operate may soon be entirely removed.

In summary, while no attempt is here made to set forth the exceedingly complex situation as to the freight rates themselves, it may be very conservatively stated that North Carolina, in general, has as low or lower freight rates as any other Southern state.

PULLMAN SERVICE

The Pullman Company operated Pullman car services over 1,394 miles of railroad in North Carolina in 1935.

They report earnings in intrastate service of \$18,594 for the year, and paid taxes in the total amount of \$6,488.

EXPRESS COMPANIES

There were two Express Companies doing business in North Carolina in 1935. The largest of these, the Railway Express Agency, operated on 2,754 miles of steam roads, 26.6 miles of electric lines, 171 miles on motor bus lines, and 87.0 miles on gas motor railway, a total of 3,038.65 miles. This is approximately 1.2 per cent of the total mileage operated by this Company. No details are available for traffic carried in North Carolina.

The Southeastern Express Company operated in 1935 on 1,353 miles of steam roads and 197 miles of other roads, a total of 1,550 miles, representing 14.7 per cent of the total mileage operated by this Company. Taxes paid in North Carolina during the year amounted to \$32,549.

WATERWAYS AND TERMINALS

North Carolina now has two ports of entry for ocean-going vessels, at Wilmington on the Cape Fear River, and at Morehead City.

Wilmington was for many years the only terminal to which deep-draft vessels had access, since the depths of water over the bars at the various inlets through the barrier reefs was nowhere else sufficient to pass any but light-draft coastwise steamers.

Dredging over the bars at the mouth of the Cape Fear River permitted a channel depth of thirty feet at this point, and there developed a very considerable volume of export and import shipment at this port. Excellent railroad connections made this an excellent port, through which this volume of freight moved to and from the entire State. In more recent years the thirty-foot channel has been maintained to the railroad terminals at this point.

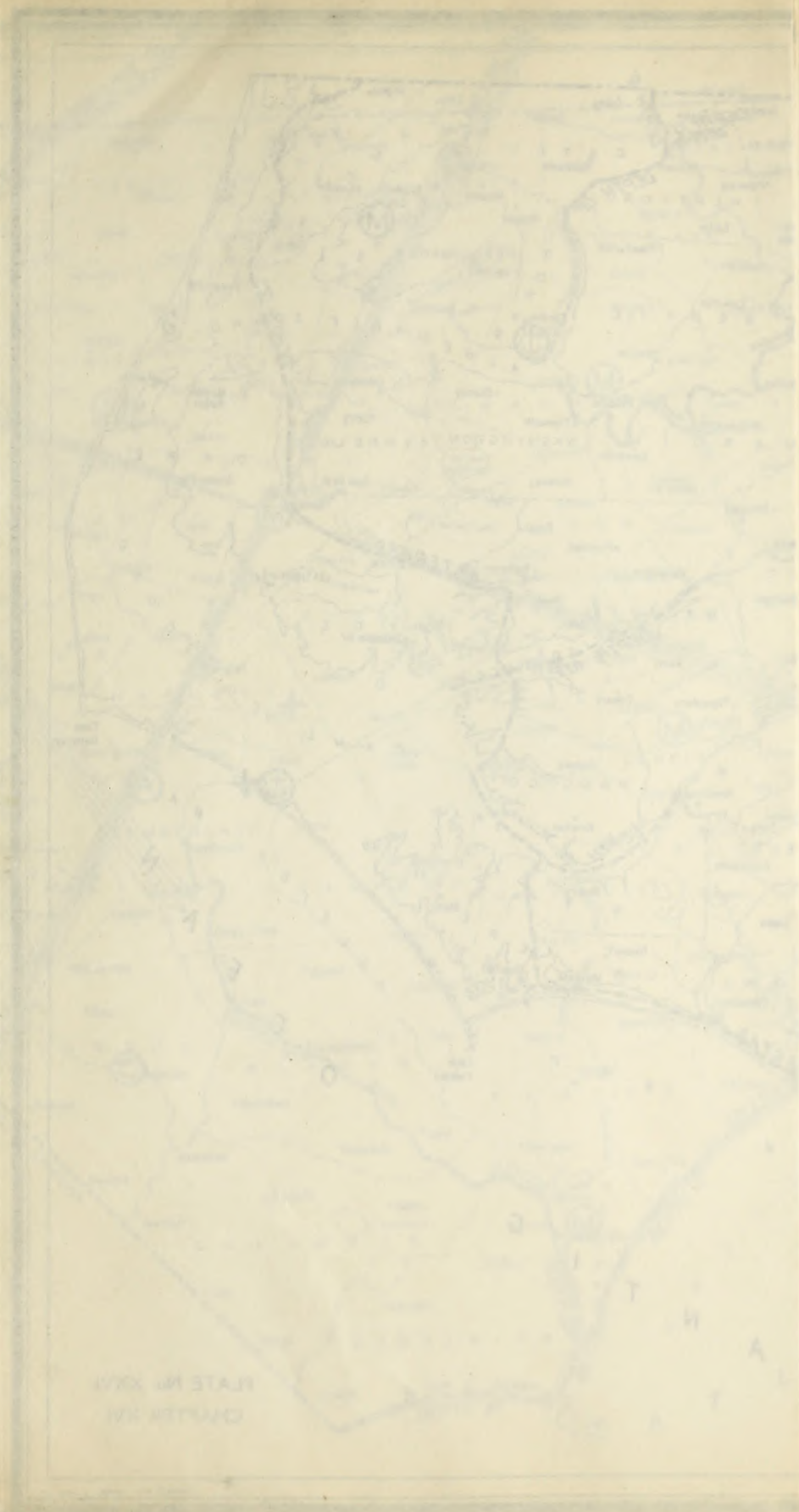
In 1935 and 1936, a channel of similar depth and adequate width for ocean-going vessels was dredged through Beaufort Inlet to a harbor and turning basin at Morehead City. With the assistance of a loan and grants by the Public Works Administration, a freight terminal has been completed at this point, connecting also with the Intracoastal Waterway, thus providing the State with an additional port which promises to become an important part of the transportation facilities. Rail connection is provided here by the Atlantic and North Carolina Railroad, from Beaufort and Morehead City to New Bern, Kinston, and Goldsboro. By means of this road and its continuation through the North Carolina Railroad now operated by the Southern Railway System, connection is made with the through north-south trunk lines of the Seaboard Airline Railway at Raleigh and the Atlantic Coast Line Railroad at New Bern, Kinston, Goldsboro, and Selma.

Excellent dock and storage facilities are available to shippers at both Wilmington and Morehead City, and from both places rail connections and hard surface highways give ready access to all parts of the State. These improvements place North Carolina ports in direct competition with the ports at Norfolk, Va., and Charleston, S. C.

Within the last year (1936), the construction of Lock and Dam No. 3 at Tolars Landing on the Cape Fear River makes slack-water navigation possible as far as Fayetteville. Here the construction of a dock and terminal completes facilities for developing water-borne traffic at this point.

Another great addition to the waterway facilities of North Carolina was made by the opening of the Intracoastal Waterway, or Inland Waterway, as it is sometimes called. Entering Currituck Sound from Chesapeake Bay, this Waterway traverses Albemarle

Pelham
Ruffin
A M
C
onville
R D
A
Allamahaw
Osceola
Waldo
C H
Bear Creek
High Falls
Hemp
Oak
M O O R
Pinehurst
New
O N D
ham
Mc Nair
SCOTLAND
Laurinbu
Johns
AIR LINE TO CHARLESTON



STATE OF SOUTH CAROLINA
CHAPTER 101

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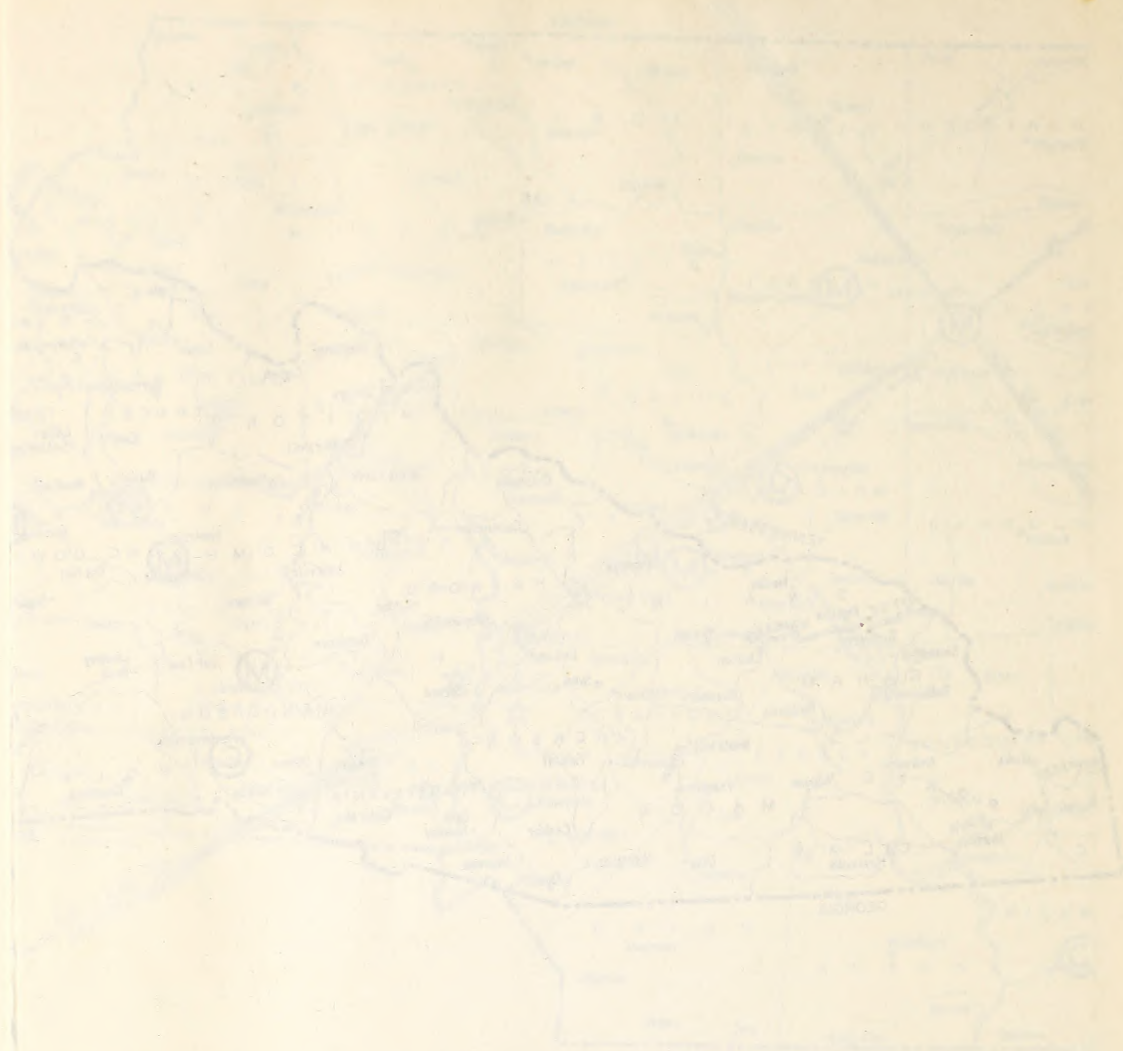
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WATERWAYS AND PORTS

- (M) Main
- (C) Canal
- (R) River
- (D) Dock
- (P) Port
- (L) Lock
- (+)
- (*)

Scale 1:100,000
Sheet 1 of 2

Sound, Alligator River, Pungo River, Pamlico Sound, crosses Carteret County to Beaufort, and thence follows Bogue Sound and a channel cut through the shallow sounds behind the "banks" to the Waccamaw River and South Carolina points. Depths in this channel as now provided are as follows: from Norfolk, Va., to Wrightsville Causeway, 12 feet; from Wrightsville Causeway to Cape Fear River, 10.5 feet; thence to Little River, S. C., 8.0 feet, the depth in the Cape Fear River channel proper being thirty feet. Connecting with the rivers and sounds along the entire length of the coast, with rail connections at Belhaven, Beaufort, Wilmington, and Southport, this Waterway is destined to play an ever increasing part in the development of the coastal area of the State. Reference to the chapter on Water Resources will show the extent to which the rivers of North Carolina have been made navigable.

With the ports at Wilmington and Morehead City, navigation to Fayetteville, the Intracoastal Waterway and shallow-water navigation in other streams, the sounds and through the inlets, North Carolina is provided with combined resources for waterway transportation which, taken in connection with the abundant rail and highway facilities, provides the means for almost unlimited development of industry and commerce in this region.

AIRWAYS

North Carolina, the birthplace of aviation, is traversed by two regular scheduled mail and passenger air routes, operated by the Eastern Air Lines. The New York to Miami route, makes Raleigh the only stop between Washington, D. C., and Charleston, S. C. The New York to Atlanta route crosses the State over Winston-Salem and Charlotte. Additional schedules are announced for the near future.

There are thirty airports and landing fields recorded in the Department of Commerce, Bureau of Air Commerce, classified as follows:

Municipal Airports:

Asheville-Hendersonville, Black Mountain, Elizabeth City, Greensboro, Kinston, Marion, Morganton, Pinehurst-Southern Pines, Raleigh, Rocky Mount, Salisbury, Wilmington, and Winston-Salem. Total, 13.

Commercial Airports:

Burlington, Chapel Hill, Charlotte, Hendersonville, Lumberton, and Rockingham. Total, 6.

U. S. Army:

Pope Field (Fort Bragg near Fayetteville).

Intermediate Landing Fields (Department of Commerce):

Lexington, Maxton, Warrenton. Total, 3.

Marked Auxiliary Landing Fields:

Dunn, Gibsonville, Goldsboro, Lenoir, Tarboro. Total, 5.

Seaplane Anchorages:

Edenton, Ocracoke. Total, 2.

The most important airports, all fully equipped with lighting service and plane service and repair, both day and night, are: Charlotte, Greensboro, Pope Field (Fort Bragg), Raleigh, Rocky Mount, and Winston-Salem. At all these ports, and at Maxton, Lexington, and Warrenton, revolving beacons are maintained.

Radio range beacons are operated continuously at Raleigh and Greensboro ports.

The two regular established routes above described are marked throughout their entire length with revolving beacons with on-course flashing signals, spaced at intervals of approximately ten miles. Numbers of emergency landing fields are located along these routes.

A measure of the increasing importance of these airways as transportation facilities can be gathered from the following statistics of operation on the Eastern Air Lines Division for the six months ending June 30, 1936.

New York to New Orleans via Atlanta:

Miles Flown	804,626
Passengers Carried	9,511
Passenger-Miles Flown	4,828,163
Mail (pounds)	258,737

New York to Miami:

Miles Flown	1,579,432
Passengers Carried	32,762
Passenger-Miles Flown	14,791,166
Mail (pounds)	393,941

While not to be classed as an adjunct to airway transportation, it seems fitting here to speak of the National Monument erected at Kill Devil Hill near Kitty Hawk, to honor Orville and Wilbur Wright and to mark the place where the first successful airplane flight was made. This beautiful monument attracts many visitors.

RADIO BROADCASTING FACILITIES

There are ten radio broadcasting stations now operating in North Carolina, listed as follows:

City	Call Letters	Power (Watts)
Asheville	WWNC	1,000
Charlotte	WBT	50,000
Charlotte	WSOC	250 (Day)
		100 (Night)
Durham	WDNC	100
Greensboro	WBIG	1,000 (Day)
		500 (Night)
High Point	WMFR	100
Raleigh	WPTF	5,000
Rocky Mount	WEED	250 (Day)
		100 (Night)
Wilmington	WMFD	100
Winston-Salem	WSJS	100

The Business Census for Broadcast Stations for 1935, covering all the above stations except High Point, reports revenue from sale of time for North Carolina stations as \$665,866. This came from local advertisers, \$403,306; from national networks and national and regional spot advertisers, \$262,560. The station personnel totalled 116 persons. The payroll for these operatives was \$182,837.

TELEGRAPH COMPANIES

The Western Union and Postal Telegraph Companies have lines and offer telegraphic services in North Carolina.

The Western Union Company collected \$319,470 in intrastate revenue and \$1,056,206 in interstate revenue in 1935. Their total expenses amounted to \$1,343,406, including taxes in the sum of \$50,462, leaving a net operating income of \$32,270. They maintained 403 offices, 4,179 miles of pole lines, 30,747 miles of open wire, 382 miles of cable, and 919 miles of underground and submarine cable. This Company serves, directly and indirectly, more than 1,300 communities in the State.

The Postal Telegraph Company operated approximately 700 miles of line in the State, from which they derived a total income of \$321,236. Expenditures were \$304,415, including \$17,515 taxes, leaving a net operating income of \$16,821.

TELEPHONE SERVICE FACILITIES

Telephone facilities are available to every community of any size in the State. A network of toll lines covers every county and connects all large cities with enough lines to insure prompt service. The major telephone companies, seventeen in number, report 112,357 telephones in actual service at the close of the year 1935.

Revenue from this service amounted to \$7,467,786.

There are approximately 75 smaller telephone companies, operating exchanges. These companies report 5,620 telephones in use, from which \$172,965 total revenue was collected.

UTILITY RATE REDUCTIONS

The Utilities Commission in recent years has pursued an aggressive policy of negotiations with various utility companies in the State, in an effort to effect reductions in consumer rates for service. As a result of this activity, and in many instances by voluntary reduction by the companies, substantial economies have been effected.

It is estimated that, based on prevailing rates before reductions were made, non-accumulative reductions amount to approximately \$6,000,000, while the total reductions over the past four years for gas, electric, and telephone services, amount to approximately \$20,000,000.



CHAPTER XVI

ECONOMIC STATISTICS AND INDICES FOR NORTH CAROLINA

There is presented herewith various summaries and statistics which will serve to give additional measures of the commercial and economic development in North Carolina. Taken from various sources, which are indicated, they may not always be on a comparable basis, but may be useful as indications of the commercial activity and possibilities for further extension of business.

The figures given on Wholesale, Retail, and Service Business are from recent releases of the Bureau of the Census. Figures on Banks were taken from records of the North Carolina Commissioner of Banks, Gurney P. Hood, while the data on Insurance Companies, risks, income, and losses, are from the reports of Dan C. Boney, Insurance Commissioner for North Carolina.

The miscellaneous statistics on Consumer Markets are taken from the *Market Data Handbook* for 1936, published by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce.

WHOLESALE BUSINESS IN NORTH CAROLINA

The following summary is presented from the preliminary report of the Business Census for North Carolina for 1935.

In this year there were 2,411 wholesale establishments in the State with net sales during the year of \$547,328,000, a gain of 39 per cent over the year 1933, but still short of the 1929 peak by 21 per cent. These percentage changes are not corrected for variation in the price levels for the two years.

The total payroll for employees was \$21,360,000, a gain of twenty per cent. This payroll was paid to 17,467 employees, not including 1,458 active proprietors and firm members of unincorporated businesses. Of the total payrolls, \$20,107,000 was paid to full-time employees, a gain of 24 per cent over 1933, while the remainder, paid to part-time employees, declined 19 per cent.

The stocks reported at the end of the year totalled \$61,191,000, a gain of 15 per cent.

The table below shows the distribution by types of operations or functions performed.

TABLE LXXVI
TYPES OF WHOLESALE BUSINESS

Type of Operation	Establishments	Net Sales	% Change
Full service and limited-function wholesalers	1,141	\$179,089,000	+31
Manufacturer's Sales Branches	159	75,120,000	+66
Manufacturer's Sales Offices	42	33,449,000	+90
Bulk Tank Stations	509	49,770,000	+35
Agents and Brokers	299	153,541,000	+27
Assemblers	261	56,359,000	+57

RETAIL BUSINESS

The summary of Retail Business for North Carolina presented herewith is taken from the Preliminary Report of the Business Census released as of October 5, 1936.

The total sales amounted to \$462,613,000 in 29,438 stores, an increase of 27 per cent over 1933. For the period 1929 to 1933 there had been a decrease of 44 per cent in total sales.

There were 60,150 employees, an increase of 13 per cent, who were paid a total of \$44,082,000, an increase of 25 per cent. This number of employees does not include 27,298 active proprietors of unincorporated businesses.

The reports are subject to some correction in some parts of the State, because of incomplete coverage.

The major groups report sales as following.

TABLE LXXVII
TYPES OF RETAIL BUSINESS

Business	Sales	% Change	Payrolls
Food Stores	\$ 92,037,000	+19	\$ 6,704,000
Beer and Liquor	1,625,000	Not comparable	77,000
General Stores (with food)	41,743,000	+ 3	2,324,000
General Merchandise	54,470,000	+ 1	5,650,000
Apparel Group	32,600,000	+64	3,659,000
Automotive	85,364,000	+72	7,747,000
Filling Stations	43,371,000	+22	3,315,000
Furniture, etc.	22,503,000	+33	3,563,000
Lumber, hardware, etc.	23,658,000	+43	2,655,000
Eating Places	14,660,000	+21	2,331,000
Drinking Places	1,104,000	Not comparable	163,000
Drug Stores	18,674,000	+19	2,612,000
Farmers' Supplies	11,936,000	+34	696,000
Other Stores	17,932,000	+21	2,501,000
Second-hand Stores	936,000	+12	162,000
Total	\$462,613,000		\$44,082,000

SERVICE ESTABLISHMENTS

The Business Census report on service establishments in North Carolina, in 1935, shows there were 8,103 such establishments, doing a volume of business amounting to \$19,561,000, employing 10,399 persons, and with payrolls amounting to \$5,844,000.

The establishments were divided into Personal Service, Business Service, Repair Service and Custom Industries, and Miscellaneous Service. The most important of the first group were Barber Shops (1,659 in number), Beauty Parlors (650), Cleaning and Pressing Shops (526), Shoe Repair Shops (735), and Funeral Directors, etc. (310). This group includes more than half of the total number of establishments reporting, or 4,984, had receipts of \$11,874,000 and payrolls amounting to \$3,739,000.

Under Business Service are listed adjustment and credit bureaus and collection services, blue printing plants, dental laboratories, mailing services, sign painting, and like services.

The third group, repair services and custom industries, includes thirty or more classifications, the most important of which are shown in the following table.

TABLE LXVIII
CLASSIFICATION OF REPAIR, SERVICE, AND CUSTOM INDUSTRIES

Kind of Establishment	Number	Employees, Proprietors	Receipts	Payrolls
Grist Mills	670	909	\$ 523,000	\$88,000
Saw Mills, etc.	717	1,472	1,104,000	369,000
Agricultural Service Threshing, etc.	515	840	384,000	59,000
Blacksmith Shops	357	438	252,000	32,000
Jewelry Repair	229	283	420,000	37,000
Printing and Publishing	102	204	248,000	54,000
Upholstery and Furniture Repair	112	231	269,000	78,000

BANKING STATISTICS

The Business Census report on Banking Institutions in North Carolina, for 1935, shows there are 338 banks in the State. This includes Federal Reserve banks, National and State commercial banks, savings banks, trust companies, industrial and Morris Plan banks, and Joint Stock Land banks. Building and Loan Associations, Federal Savings and Loan Associations, and investment banks are not included. Separate statistics are given for unit and branch bank systems, a branch bank being defined as one office of an organization operating one or more banks or agencies in addition to the parent bank. There are 37 such systems in North Carolina, with 125 branches.

	Number Banks	Employees	Annual Payroll
Unit Banks	213	1,548	\$2,356,265.00
Branch Banks	125	982	1,469,864.00
Total	338	2,530	\$3,826,129.00

The number of employees includes 826 executives, with a payroll of \$2,016,135.00; and 1,704 other employees, with a payroll of \$1,809,994.00.

"The Tarheel Banker," organ of the North Carolina Bankers Association, in the issue of July, 1936, lists the following banking institutions in North Carolina.

State Banks	169
State Bank Branches	70
National Banks and Branches	47
Industrial Banks and Branches	31
Joint Stock and Land Banks	2
Investment Banks	2
A. I. B. Chapters	9
Teller Window Branches	14
Total	344

The Consolidated Recapitulation for the National Banks, State Banks and Trust Companies, for December, 1935 statements, follows.

Number National Banks	44
Number State Banks and Trust Companies	170
Total	214

LIABILITIES

Capital	\$ 27,133,000
Surplus	12,400,000
Undivided Profits and Reserves	9,165,000
Deposits	366,895,000
Other Liabilities	1,983,000
Total	\$417,576,000

RESOURCES

Cash and Exchange due from Banks	\$132,987,000
U. S. Government Securities	83,189,000
Other Securities	60,239,000
Loans and Discounts	125,659,000
Other Resources	15,502,000
Total	\$417,576,000

BANKING RESOURCES

The following figures are taken from the Commissioner of Banks for North Carolina, as of December 31, 1935.

State Banks—December 31, 1935

Number of Commercial Banks	171
Number in Voluntary Liquidation	8
Number of Branches	84
Total Resources	\$305,051,060.88
Number of Industrial Banks	29
Number in Voluntary Liquidation	3
Number of Branches	2
Total Resources	\$ 13,267,784.05

SUMMARY

Total Assets State Banks (263)	\$305,051,060.88
Total Assets National Banks (44)	98,856,000.00
Total Assets Industrial Banks (34)	13,267,784.05
Total	\$417,174,844.93

COMMERCIAL BANKS

Earnings, Expense, and Dividends

Earnings	\$9,451,328.53
Expense	6,496,631.95
Net Operating Profit	2,954,696.58
Ratio—Earnings to Capital	10.4%
Undivided Profits, January 1, 1935	2,371,610.55
Undivided Profits, December 31, 1935	3,156,151.19
Dividends Paid and Accrued (Preferred)	192,618.76
Addition to Surplus	779,654.00
Dividends, Common Stock	746,314.00

INSURANCE STATISTICS

Companies Licensed to do Business in North Carolina

Fire, and Fire and Marine Companies (Stock)	179
Fire, and Fire and Marine Companies (Underwriters)	18
Fire, and Fire and Marine Companies (Mutuals)	40
Fire—Factory Mutuals	25
Reciprocal and Interinsurance Exchanges	10
Fire Reinsurance Only	28
Life Insurance—Legal Reserve, Stock and Mutual	79
Life Insurance—Assessment	2
Miscellaneous Companies, Casualty, Indemnity, etc.	77
Fraternal Orders	21
Non-Resident Brokers	206

BUSINESS FOR YEAR ENDING DECEMBER 31, 1935

	Net Risks Written	Net Premium Receipts	Net Losses Incurred
Stock Companies	\$1,247,516,778	\$ 9,664,023	\$3,906,512
Stock Companies (Foreign)	167,347,131	1,215,685	418,678
Mutuals (Other States)	187,972,842	1,231,340	319,799
Mutuals (North Carolina)	3,645,542	85,773	32,992
Reciprocal		374,299	214,721
Total	\$1,606,482,293	\$12,571,120	\$4,892,702

CLASSIFICATION OF MAJOR INSURANCE RISKS

Fire	\$1,086,812,190
Inland Navigation and Transportation	221,570,916
Tornado, Windstorm and Cyclone	113,148,196
Riot, Civil Commotion, Explosion	79,686,191
Motor Vehicle	75,587,449
Sprinkler Leakage	16,028,943
Miscellaneous	13,648,408
Total	\$1,606,482,293

LIFE INSURANCE STATISTICS YEAR ENDING DECEMBER 31, 1935

Ordinary Business—North Carolina Companies

Number Policies Written	37,570
Amount of Insurance	\$ 39,910,094
Premiums Received	\$ 6,207,753
Insurance in Force—Policies	134,873
Insurance in Force—Amount	\$ 219,447,452
Number of Companies	11

Industrial Business—North Carolina Companies

Number of Policies Written	497,755
Amount of Insurance	\$ 81,933,812
Premiums Received	\$ 4,046,130
Insurance in Force—Policies	687,313
Insurance in Force—Amount	\$ 112,236,545
Number of Companies	8

Ordinary Business—Companies of Other States

Number of Policies Written	50,284
Amount of Insurance	\$ 85,369,050
Premiums Received	\$ 21,454,275
Insurance in Force—Policies	327,431
Insurance in Force—Amount	\$ 696,300,725
Number of Companies	67

Industrial Business—Companies of Other States

Number of Policies Written	214,801
Amount of Insurance	\$ 47,935,388
Premiums Received	\$ 5,295,736
Insurance in Force—Policies	801,544
Insurance in Force—Amount	\$ 144,025,162
Number of Companies	7

Group Business

Number of Policies Written	170
Amount of Insurance	\$ 24,255,730
Premiums Received	\$ 1,010,958
Insurance in Force—Policies	640
Insurance in Force—Amount	\$ 89,768,870
Number of Companies	19

Recapitulation—All Companies

Total Number of Policies Written	800,580
Amount of Insurance	\$ 279,404,074
Premiums Received	\$ 38,014,852
Losses Incurred	\$ 12,716,766
Insurance in Force—Policies	1,951,801
Insurance in Force—Amount	\$1,261,778,754

Fidelity and Casualty Companies

	Premiums Received	Losses Paid
Accident	\$ 830,451	\$ 440,859
Health	650,389	380,077
Auto Liability	1,869,445	1,270,963
Other Liability	492,058	117,361
Workmen's Compensation	2,410,784	1,071,897
Fidelity	432,580	169,179
Surety	458,856	201,659
Burglary and Theft	219,664	66,736
Auto Property Damage	675,920	226,650
Steam Boiler	118,510	12,341
Miscellaneous	531,531	390,467
Total	\$8,690,188	\$4,348,189

Fraternal Insurance Orders

Number Companies	22
Net Premiums Received	\$1,049,459
Claims Paid	\$ 591,996

MARKET DATA

(U. S. Department of Commerce—Market Research Series No. 15)

The following data is extracted from the *Market Data Handbook* for 1936, issued by the Bureau of Foreign and Domestic Commerce.

Population (1930)	3,170,276
Retail Sales (1933)	\$363,111,000
Sales per Capita	\$115
Wholesale Sales (1933)	\$423,127,000
Service, Amusements, and Hotel Receipts (1933)	\$26,840,000
Postal Receipts (1934)	5,907,000
Personal Income Tax Returns	30,886
Number per 1,000 Population	9.7
Number Homes Wired or Electricity (1930)	213,720,000
Percentage Urban Population	25.54%
Ratio Urban Retail Sales to Total	0.6945
Ratio Urban Wholesale Sales to Total	0.7972
Income Tax Returns per 1,000 Rural Population	32.8
Number Passenger Cars Registered (July 1, 1934)	265,517
Commercial Trucks, etc.	43,364
Residence Telephones (January 1, 1935)	90,158
Business Telephones (January 1, 1935)	55,709
Number Gas Customers (1931)	45,843
Homes Having Radios (January 1, 1935)	266,924
Total Electric Customers (1935)	278,344
Number Domestic Service	219,842
Number Farms Served	10,245
Total Number Farms	300,967
Savings Deposits	\$123,353,000

CHAPTER XVII

FUTURE PROGRESS IN NORTH CAROLINA

In the foregoing chapters of this volume there has been presented a composite picture of the abundant resources, both physical and human, to be found in North Carolina, together with a general statement of the development of these resources through extractive, agricultural, and manufacturing enterprises.

The inventory discloses such a vast array of natural wealth that one may well agree with Walter Lippman's conclusion of a decade past, that "everything that was ever possible for civilized man is possible here." Or, as one geographer, quoted by Dr. Howard W. Odum in *Southern Regions*, has said, the South was "one of two regions on this earth and only two which will outdistance all others . . . Above all the regions, they are the gardens of the world."

Any effort to present these excellencies adequately will require terms to express greatness in quantity and superlatives when related to quality.

Physiographically the State is seen to be in a region of large extent and wide variety of formation. From the lofty mountains of the west, to the sandy barrier reefs of Cape Hatteras, there will be found steep mountain slopes and deep secluded valleys, rolling hills, wide valley basins, broad level coastal plains, great expanses of tidal marshes, inland sounds and ocean shores. Extending from the mountains to the Atlantic Ocean, across the State are eight extensive river basins providing every opportunity for the development of power, for water supplies and navigation, providing a habitat for food and game fish, and affording everywhere endless possibilities for recreation.

North Carolina belongs to that small portion of the earth's surface where rainfall abounds, where mild temperatures prevail throughout the major portion of the year. While the extremes of average annual rainfall range from 40 to 80 inches per year, almost the entire area of the State has an average rainfall of about forty-eight inches, with comparatively little variation from that amount, and freedom from droughts and long periods of excess precipitation.

In temperature, too, the greater portion of the State enjoys a mean annual temperature of approximately 60 degrees, and except for the higher mountain levels, with little snow and only short periods of extreme cold. This permits a long growing season, thus permitting wide-spread cultivation of cotton and in some regions the growing of two crops on the same land.

The geology of the region is shown to be complex in its history and with such a wide variety of formations as to permit an unusual richness of mineral wealth, widely distributed throughout the State.

The variety of topography and elevation permits an endless variety of plant and animal life, great forests of many species, and soils to make possible the growing of an unusually large number of crops and fruits.

Living amid these abundant resources is to be found a people of superior quality, possessed of many distinctive and desirable traits, of strong loyalties and individualistic in customs and manners. In recent decades they have displayed their power and their capacity to achieve a notable progress. Through one crisis and another they have shown resourcefulness and ability that gives rich promise of the further development of a rich

cultural and economic heritage. Population studies presented show the characteristics and distribution of growth in numbers. There is shown to be an unusual percentage of native-born whites in a population where the ratio of the white people to the total population is small. Movements, migrations, changes in occupation and in racial ratios throw much light on past history and future possibilities. These studies show too the incidence of social problems relating to rapid increase in urbanization and changing age groups.

In the chapter on Government, there was presented the structure of the government which this people have erected through the years, and a review of the manifold services which the State and its subdivisions perform for their citizens. Federal, State, County, and Municipal governments alike have responded to the growing demands of a rapidly changing State, demands due not only to an increasing population, but due also to the ever widening range of services which this people have come to expect from a government. The rapid expansion in personnel required to carry on these services and the corresponding increase in public revenues and expenditures is presented as another measure of progress in North Carolina.

The chapter on Education attempts in brief compass to record the development of public education and the provision of facilities for elementary and higher learning and for the training of its citizens. From meagre beginnings, the last three decades has shown the rise of interest in and expenditures for public education which has attracted wide-spread attention. While much remains to be done, the present situation finds educational opportunities presented to every child in the State, white and negro.

Modern buildings, universal public transportation, high and constantly improving standards of teacher training and scholastic work, an efficient administration, are only a few of the criteria by which progress may be measured and the interest of the State in education may be shown.

In a similar way, the review of the provisions made for the care, education, and rehabilitation of the dependent and defective wards of the State gives evidence of a keen sense of public responsibility actuated by kindly and humane motives. State, county, city, and private work for public welfare in all of its phases is described.

The chapters on agriculture, forests, minerals, water, wildlife, fisheries, and recreation, seek to present to the reader, summary statements of the extent and character of these resources, statistics of present production, employment and value, and in each instance to point the way to still further advances.

In agriculture there is found a vast area of various soils adapted to successful production of many commercial and subsistence crops, to farm woodlands and forests, and pastures to support a far greater program for livestock production than has yet been adopted. Many significant changes in policy are indicated, in the need for conserving the soil fertility, of classification for better land use, for increased diversity and the development of self-sufficing farm production programs.

In this as in other natural resources there is increasingly evident a need for better planning to conserve the unreplaceable resources, through more intelligent use and avoidance of waste, and to use and develop the remaining resources for the best use of the greatest number of people.

Following this composite picture of the natural wealth, is the chapter on industry and industrial opportunities. Here an effort was made to present in summary form the industrial development of North Carolina, perhaps the greatest change in culture that any large region has experienced in the same length of time. Detailed description of the major industries was presented and analysis made of the many industrial opportunities, for the extension of existing industries and the development of new fields for extractive and processing industry.

Chapters on power, transportation and communications, describe the development and present facilities available. Power, perhaps the basic factor in industrial progress, is widely available in almost any quantity and at reasonable rates. Highways, railways, and waterways provide a facility and cheapness of transportation rarely excelled, permitting the free flow of goods and people, so necessary to the development of commerce and trade. Financial and business statistics are presented as additional measures and indices of progress.

This inventory of natural and human wealth wholly justifies the appraisal of North Carolina by this criterion as possessing abundance almost unlimited. Measured by the progress and by the development of these resources, particularly during the last quarter of a century, one would be obliged to rank North Carolina as one of the most progressive states in the Union. However, if the measure be made the economy of use of these resources, the conservation of irreplaceable wealth, the development of adequate organization and cultural advance, the achievement of high standards of living in city and on the farm alike, or if comparisons be made with other regions, the ranking may not always be so high. Many of these most valuable resources have been developed in wasteful ways, thousands of acres of burned-over lands have been allowed to lie in idleness, and forests have been cut and destroyed that might have been kept in continuous production. Soil fertility has been exhausted by crops and washed into the stream beds or allowed to fill reservoirs or cover fertile bottom meadows, and land has been cultivated for years that in many instances was never suitable for agriculture, while thousands of farmers have lived barely above the subsistence level. Adherence to habits of tenancy and share-cropping, poor credit and financing methods and over-emphasis upon the production of cash crops, has long taken its toll of agricultural income. Millions of dollars have been spent for feed stuffs for man and beast, that could have been raised at home, and for fertilizers that would have been unnecessary if soil improvement crops and adequate livestock production had been a universal custom instead of an occasional venture by a few.

Wholesale taking of wild game, birds, and fish, and unregulated commercial fisheries had made heavy inroads into these resources before adequate conservation and protection laws were adopted. Only the most vigilant efforts will restore the abundance that once was found here.

While a few daring souls were laying the foundations for the development of resorts and facilities for recreation, the great areas of the mountains and the coast are only now on the way to an adequate recognition of their possibilities as a great source of income to the State and a great source of inspiration, health, and pleasure.

The task is not complete. It is not too late to begin to stop these wasteful processes, to correct these maladjustments, and in every sense plan and build the North Carolina of Tomorrow.

In the following sections of this chapter there will be presented some of these great problems arising in the areas of deficiency and suggestions made for policies and steps to be taken to correct these faults and to point out anew the opportunities for future progress.

There are many reasons for believing that the most important next step towards the wiser use of resources and the correction of many existing unfavorable trends lies in the field of agriculture and in the conservation of what is perhaps our basic resource, the fertility of the soil.

This will be presented under four general heads: desirable land use adjustments, soil conservation, an agricultural production program, and the building of a finer standard of rural living. These are so closely related to each other as to be almost inseparable, but will be discussed under these headings.

LAND USE ADJUSTMENTS

Rural distress may be caused by many factors, some external and economic, some internal and social. Shrinking demand through loss of export markets, domestic depression or industrial prosperity, a credit system poorly adapted to agriculture must always be considered and from time to time may become of first importance, but the process of land utilization itself must be considered.

This process may be affected by institutional factors as size of farms, the effect of tenancy and share-cropping, or by improper adjustment of use of specific areas to the character of that land. The adjustments that can be made fall into six categories: (1) Replacement of crop farming by less intensive types of use. This is the adjustment widely referred to as that related to "sub-marginal" land. Land may become unsuited to crop farming because of comparative advantage given to other areas, new and more productive, mechanized agricultural production, loss of fertility through erosion and depletion by cropping; availability of poor land to poor people; (2) Instituting constructive use and management of forest and cut-over lands; (3) Increasing the size of farms to provide adequate income and permit soil maintenance; (4) Changes in cropping system to reduce erosion; (5) Improving land drainage, preventing flood damage on existing farms.

A review of North Carolina farms shows that some or all of these adjustments are needed in wide areas of the State. In the Southern Highlands and their margins, where generally every foot of arable land has been occupied, it is very probable that many acres of this land, now depleted and subject to serious erosion, should be withdrawn from crop farming and converted to more constructive use in forests, pasture, and recreation. Existing and future forest areas should be constructively managed, farms in less rugged areas increased in size and erosion control measures should be actively carried out on all areas where cropping will continue. In the hilly cotton and tobacco regions these same four adjustments should be made. Forest production is mainly indicated on much of the depleted and eroded lands. The raising of more subsistence crops or livestock should be encouraged, and credit systems and tenant supervision should be adjusted accordingly.

Even in the coastal plain areas, where agriculture is relatively stable, the average farm income is low. The very considerable areas of forest land greatly need a more constructive management. Here, as in the nearby large cut-over regions, the forests are largely composed of fast-growing species of high utility and the area has a high advan-

tage in wood production. The scattered settlements or poor land through these areas should be eliminated. Improvement in tenure and increase in subsistence crops for man and beast, with consequent lesser emphasis on cash-cropping, is urgently needed.

SOIL CONSERVATION

The combination of high rainfall, highly erodible soils and a large proportion of "clean-tilled" crops, make for losses incurred in soil erosion in North Carolina that are almost beyond comprehension. Investigation discloses that accelerated erosion is active on nearly 40 per cent of the total area, exclusive of cities and water areas, in the State. From one-third of this area, three-fourths of the original topsoil has been lost, while from one-fourth to three-fourths of the topsoil has been lost from over 9,000,000 acres of land. Worse yet, 5,647,000 acres of land have been affected by gullying or erosion in its later stages, while 1,410,000 acres, four and one-half per cent of the total area of the State, is lost or destroyed for tillage purposes. Erosion has been greatest in the Piedmont, but occurs widely in other areas. This soil goes into the streams, to pollute the water, fill up the reservoirs with silt, cover bottom lands and fill flood channels. Consequently, floods increase in frequency and height, and water supplies become more uncertain.

Measures of control have been well developed. These practical measures include adaptations of thick growing vegetation, the use of terraces and other engineering devices, to reduce the rate of run-off and permit greater percolation, and in many cases the retirement of excessively erosive land from cultivation. These methods, when carefully adapted to particular areas, and desirable adjustments of land use, will conserve and guard the soil and water resources for this day and also for tomorrow.

Every effort should be put forth, by every agency interested in public welfare, to extend the work of soil conservation in every part of North Carolina.

AGRICULTURAL PRODUCTION PROGRAM

Not only should adjustments be made in land use, and comprehensive measures taken to stop waste through soil erosion, but also every effort should be made to bring about a more balanced agricultural production for the State as a whole and for every farm in the State. For years North Carolina has grown too many acres of cash crop and not enough feed and soil improvement crops. The agricultural leaders long ago began to realize this fact, and through every agency of education and demonstration sought to bring about a change. The Agricultural Extension Service, through its field agents and publications, has endeavored to impress this need upon the farmers of the State.

During the administration of Governor O. Max Gardner, and under his leadership, emphasis was placed on the Live-at-Home program, and undoubtedly this program was very effective. The depression, with lowered prices of farm products, and the various efforts of the Agricultural Adjustment Administration, have brought many more to realize this need, but the end is not yet. There is still a great need in North Carolina for the adoption of rational farm production programs, based on the best use of the soil on each farm, the provision for adequate living for all the occupants, conservation of the soil fertility and a balanced production of money crops, subsistence crops, and livestock. No uniform standard may be established, since some farms would be better adapted to money crops, while others will be operated best for livestock. However, having regard to the dominant type of farm enterprise, the adaptation of crops to soil, the general rela-

tion of the area to commerce and industry, it is possible to prepare for every farm a production program that would be best for the land, best for the farmer, and best for the whole community.

Not only would the farmer live at home and his farm become self-sufficing to a greater degree than ever before, but the maximum productivity of the land would be secured without drawing upon the basic capital resource, the fertility of the soil.

In *Extension Circular No. 308*, issued by the North Carolina Agricultural Extension Service, the following needs are described as applying generally to the agriculture of the State:

1. Definite crop rotations.
2. Fewer areas of row-crops, especially cash crops.
3. More acres of leguminous soil-improvement crops.
4. More acres of erosion-preventing crops, such as small grains, winter legumes, and clover.
5. Sowing of soil-improvement and erosion-preventing crops on idle lands.
6. More food and feed crops for home use.
7. Higher yields and quality of all crops.
8. Better pastures.
9. More livestock, to give more products for home use and to improve the soil.
10. Terraces on all rolling lands.

In this same Bulletin will be found general recommendations for each area of the State, showing crops best adapted to each soil type commonly found therein, fertilizer requirements, normal yields, rates of seeding, recommended crop rotations, and specifications for the permanent pastures.

If means could be provided to put these programs into actual production, the improvement in agricultural income in the position of the State on the balance sheet of resources would be tremendous. Progress has been made. It remains for the future to see whether it will be maintained.

Another marked deficiency in the State, closely related to agricultural progress, is in the standard of farm housing. Surveys recently made in ten sample counties show that a very large proportion of farm houses are inadequate and deficient in equipment. Water supply and sanitation conditions fall far short of adequacy, in many farm homes. Many of the conveniences upon which a modern home has come to depend are lacking. As with the home, so with the farm buildings and farming equipment. North Carolina ranks far too low in the proportion of farms equipped with modern farm machinery, in the comparative values of farm buildings and in the proportion of this value to the total value of the farm.

With the improvement in farm income that has marked the recent years and in the hope that better production programs will continue to raise the level of this income, many of these deficiencies will doubtless be overcome. The rapid progress in building rural electric lines will have a most helpful effect, bringing this additional facility for comfort and convenience. The educational and demonstration work of the Agricultural Extension Service, particularly in the field of Home Economics, the continued development of courses in Vocational Education in agriculture in the schools and for adults, the growth of interest in 4-H Club work, in organizations of farmers as the Grange, are potent instrumentalities for improvement. These and all movements of similar purpose

deserve ever increasing support, for by such means will Tomorrow be made a greater day in rural North Carolina.

STREAM POLLUTION

The rapid increase in population, and particularly the concentration of this population in growing cities and the development of industry in North Carolina, has brought sharply into focus the problem of stream pollution. It is apparent here as in many other parts of the Nation that the pollution of streams by municipal and industrial wastes is increasing so rapidly as to outstrip the best efforts of those whose function it is to effect an economical and rational balance between a sensible regulation and industrial and urban expansion.

Having in mind on one hand the manifold uses to which the waters of these streams are put, as sources of water supply, as the natural habitat of fish and game, as a place and means for recreation and scenic enjoyment, and on the other hand the fact that these same streams are the natural channels for drainage of the wastes of the people who live upon their banks, it can be seen that the solution must be one of adjustment of conflicting interests.

Such adjustment must be made upon sound basis of fact, and with rare judgment, lest industry be so hampered as to produce undesirable social and economic consequences.

At present the laws of North Carolina are inadequate to control and regulate stream pollution. The State Board of Health has certain powers over the pollution by sewage wastes, of any stream that is to be used as a source of public water supply. Other regulations, with exemptions for certain industries, are aimed at the conservation of fish and game, but administrative personnel and funds for enforcement are entirely inadequate.

Additional research and experimentation should be conducted so that fair standards of water for various uses such as domestic, aquatic and wildlife, and industrial, might be determined and used as a basis for regulation. Additional powers should be given the agencies upon which the administration of the acts be placed, but, more important than that, public apathy and indifference to the losses and wastes that are so rapidly increasing in extent and seriousness, must be removed. Sportsmen's organizations such as the Isaac Walton League have done much to awaken the interest of the public while educational programs by the Department of Conservation and Development, over the radio and by pamphlets, will doubtless be of great influence.

The problem daily becomes more difficult of solution, and if these great water resources are to be secured for permanent use and enjoyment, strong and effective measures must be taken at once.

COASTAL DEVELOPMENT

Two large areas of the State, one on the extreme east and one on the west, present unusual opportunities for further regional development. The first of these is an area extending along the Atlantic Coast from the Virginia State Line southerly to an indeterminate boundary below Beaufort Inlet, a distance of some two hundred miles and covering portions of twelve or more counties. This region has a land area of over five thousand square miles, and includes within its borders Currituck, Albemarle, Croatan, Roanoke, Pamlico, Core, and Bogue sounds. These sounds, with their many large tributary rivers,

their estuaries and several large inland lakes, comprise a vast area of fresh and salt waters of moderate depth, providing unsurpassed opportunities for commercial and sport fishing, boating and recreation, and for transportation. On the land areas are to be found large cut-over areas, from which great quantities of timber have been removed, which could be reforested and under proper management made to yield in time profitable timber production. Here also may still be found considerable areas of standing timber, capable, under proper management and development, of continuous production of timber for years to come.

In this area will be found a veritable treasure-house of resources, which waits only the widespread application of definite policies of conservation, restoration, and development, to become available for the use and enjoyment of the whole State. The establishment of the Croatan National Forest and the purchase by the Forestry Department of State College of large forest holdings, will lead the way to better forest management and serve to demonstrate the possibilities of this area.

The barrier reef, which is so distinctive a feature of the coast line, was once covered throughout the greater part of its extent with forests and grass. Through neglect, natural agencies, and the uncontrolled grazing of wild cattle, this ground cover was destroyed and wind and wave erosion have destroyed all traces of vegetation from large areas of land. By the construction of sand fences and the replanting of native grasses, it is believed that this unique and beautiful coastal area can be restored and made available as a recreation area for future generations. Maintaining the several inlets through this barrier will preserve the vast areas of the sounds for breeding and growing shell fish, and restore an industry that has suffered greatly in the past from dredging, storms, and deficiency in salinity of the water.

A part of the area is now being developed as a park and wildlife sanctuary, which can be made the nucleus of a great recreational center where hunting, fishing, surf bathing, boating, sailing, and camping would be available in perpetuity to the many rather than be the privilege of a few. To insure this, the projects now being carried out for erecting sand fences and sand control planting should be sustained until the whole area has been restored.

To make this area more accessible, improved roads should be extended in the land area between Albemarle and Pamlico sounds, and bridges erected to cross Alligator River, Croatan Sound, and the inlets between Nags Head and Hatteras Inlet. The purchase of bridges across Currituck and Roanoke sounds and the construction of highways to Manteo, Fort Raleigh, and Wanchese, has provided the necessary links to open up the entire area. The building of the bridge across Albemarle Sound, now under construction, is another link in the necessary highway system. These improvements to the highways will make for easier access to the interesting Wright Memorial at Kitty Hawk, the great sand dunes at Nags Head, and Fort Raleigh on Roanoke Island. Here, in 1585, was made the first English settlement in the New World, by the colonists sent out under the direction of Sir Walter Raleigh. The Fort has now been restored, after the pattern of the original settlement, and has already become a great attraction to visitors.

The work of replanting and restoring the oyster beds within the area has been extensive, but there are vast acres of potential oyster "bottoms" that should be restored to production, in an area famous for the superior quality of its oysters.

Much of the work required to develop this great area is already under way, and should be carried forward steadily to completion. Thus can be added to the State and made available to thousands, an area now relatively isolated and unused. Here can be tapped a great reservoir of natural resources, which through conservation and wise use will add greatly to the wealth and income of the people.

THE MOUNTAINS OF NORTH CAROLINA

On the western side of North Carolina lies an area of a totally different character from that just described above: namely, the southern extension of the Appalachian Mountains. Here, in an area of approximately 40,000 square miles, of which perhaps one-fourth lies within the boundaries of North Carolina, is found a region of unequalled scenic and cultural interest, which can be made into a great center of recreational activities.

The conservation of the natural resources of the region, as represented in the work and proposed development by the National Park Service (Great Smoky Mountain National Park), the United States Forestry Service, the Park to Park Scenic Highway, and the Tennessee Valley Authority, have called renewed attention the region.

The predominant characteristic of the region is its areas and points of high elevation, there being more than one hundred mountains in the area which are more than one mile high. Included in the region are Blue Ridge Mountains on the east, with Mt. Mitchell, the highest point east of the Rocky Mountains; and the Great Smoky Mountains on the southwestern boundary of the State, with many other mountain ranges of great height and beauty in between.

With forests covering great areas, much of which is still untouched, wildlife in great variety, great mountain heights, bold escarpments with their wealth of scenic attractions, gorges, waterfalls, and lakes, this region possesses an exceptional wealth of recreational resources needing only a reasonable development to become easily available to more than 50,000,000 people living in the eastern United States.

Much of this area is as yet unspoiled, presenting an opportunity for sound and orderly development, administration and control, that will preserve these natural resources for the benefit of the people of the region and for the use and enjoyment of many visitors.

The present facilities and accommodations for visitors are inadequate and need to be extended, improved in quality, and placed under more strict control. While much of the area is already controlled by various Federal agencies, there remain many points and areas of scenic and recreational significance and value, which should be added to these holdings, acquired by the State or properly developed and controlled by local interests.

The accomplishment of a full realization of these opportunities calls for a high degree of co-operation with all agencies which have immediate interest in the region. Proper control measures should be adopted and developmental agencies erected, properly to advertise the exceptional recreational advantages of this Mountain section.

This would serve greatly to increase the per capita income of the region, now far below that of the national average and in many cases below a subsistence level. If co-ordinated properly with other scenic and recreational resources of the State, there would

result a greatly increased income to other areas from tourist travel. Comparison with other recreational areas, such as New England, indicates that from one-quarter to one-half billion dollars of annual income would be realized by the inhabitants of the Southern Highlands through proper development. This would be equal to the estimated value of all the products of farm and forest, mines and industry of this region for the year 1935. Such an opportunity should be seized at once.

The opportunities for development which have been presented above are only some of the many ways in which existing waste may be eliminated, income increased, and the future welfare of all the people made more secure. Sound planning procedures must be adopted to insure that the abundance of natural resources may be conserved, properly used, and wisely developed. Only by such methods can North Carolina transmute its natural wealth into a higher and richer life for her people.

If this volume may seem to have placed too great an emphasis upon material advancement, it is because these are the problems to which it is chiefly addressed. These improvements can never be fully realized nor the benefits from them be properly enjoyed, unless there shall take place a corresponding universal development in the cultural and social life of the people. The only sound reason why these material advances should be made would be to save and use them for the building of a happier Tomorrow, for all the people, who, after all, constitute the real Commonwealth of North Carolina.

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